CHAPTER 24

Treatment of Disturbances in Perception and Cognition*

Doreen Olson†

Key Terms

Adaptive (compensatory treatment) approach
Remedial treatment approaches
Functional approach
Sensory-integrative approach
Neurodevelopmental (Bobath) approach
Transfer-of-training approach
Astereognosis
Body scheme
Ideomotor apraxia
Ideational apraxia
Constructional apraxia
Dressing apraxia
Cognitive retraining
Internal strategies
External strategies
Transfer of learning
Generalization
Orientation
Attention
Memory
Domain-specific learning
Executive functions

Chapter Objectives

After studying this chapter, the student or practitioner will be able to do the following:

1. Contrast the adaptive and the remedial approaches in treatment of perceptual dysfunction.
2. Contrast the remedial and the compensatory approaches in the treatment of cognitive dysfunction.
3. Identify compensatory strategies for specific cognitive deficits.
4. Identify the effects of perceptual motor deficits on functional skills.
5. Compare cognitive deficits to the hierarchical cognitive function in preparation for treatment intervention.
6. Analyze various external strategies to assist with transfer of learning for cognitive dysfunction.
7. Compare and contrast internal and external memory strategies for specific cognitive deficits.
8. Identify intervention strategies to assist the patient with executive function deficits, such as reasoning, judgment, awareness, and behavioral control.

Performance skills are the building blocks for the areas of occupation. The abilities to sense, to organize sensations into meaningful representations of the world, and to plan and sequence responses support every action in activities of daily living (ADL) and instrumental activities of daily living (IADL), education, work, play, leisure, and social participation. Although the occupational therapist focuses on the evaluation and treatment of occupation and performance skills, the occupational therapy assistant (OTA) has a distinct role as well. The extent of this role depends on various factors: the OTA's experience and service competencies, the practice area, the treatment setting, and the geographical location. In rural communities and general medical settings the OTA may treat disorders in performance skills more regularly because of the relative shortage of medical personnel outside metropolitan areas and the OTA's training in diverse, general practice arenas. Even in the most sophisticated rehabilitation medical setting, the OTA may provide specific intervention to enhance performance skills within the context of other treatment. An example is using verbal or physical cues to teach a cognitively impaired patient self-dressing.

Recognizing the OTA's important and variable role in intervention for deficits in client factors and their effect on performance skills in relation to activity demands, this

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chapter presents some of the techniques the OTA might use. It includes treatments that could be provided by an OTA, assuming that the assistant will acquire service competency under qualified supervision and/or attend additional educational opportunities before implementing these techniques. Settings and jurisdictions differ in guidelines for OTA services; the OTA is responsible for learning relevant guidelines and for following them to ensure compliance with state and national regulatory agencies.[54]

This chapter has two sections: perception and cognition. Each section examines the implementation of various intervention techniques in the areas of activity, client factors, and performance skills in varied contexts. Each section may be studied separately. The section on perception includes a discussion of the interaction between perception and motor action because they are intricately linked in the performance of functional activities.

Treatment of Perceptual and Perceptual Motor Deficits

Performance of functional activities relies on skills from perceptual factors as well as the motor actions that follow from perception. Because of the effect on motor action, remediation or compensation for deficits in perceptual functions results in improved functional performance.[28] Occupational therapy (OT) practitioners have used perceptual retraining since the 1950s, focusing on retraining specific perceptual skills and incorporating perceptual retraining into functional tasks such as ADL, IADL, education, and work.

Treatment Approaches

Treatment is classified into two main approaches: adaptive and remedial.[28] The **adaptive (compensatory treatment) approach,** also classified as the functional approach, provides training in ADL behaviors with the goal of improving adaptation to the environment to promote maximal functioning (Table 24-1). For example, to decrease the possible errors during upper extremity dressing, one might use buttons of contrasting color or start with the shirt partially buttoned. Using a partially-buttoned shirt also increases ease of dressing. The OTA routinely carries out adaptive treatment techniques in various settings with various patient diagnoses.

In contrast, **remedial treatment approaches** seek to change central nervous system (CNS) functions.[28] In this approach the occupational therapist might use slow rocking, spinning, or other sensory input to attempt to restore sensation, perception, and motor response. These intervention techniques have traditionally been completed by the occupational therapist except when the OTA has additional training in these skills and/or has proven service competency as determined by the facility or state regulatory board. Three remedial approaches are common: the sensory-integrative approach, the neurodevelopmental (Bobath) approach, and the transfer-of-training approach.

Table 24-1 Examples of Treatment Approaches

Approach	Activity Example: Buttoning
Adaptive approach (also known as *functional* and *compensatory*)	Change physical context such as simplify object (use colored buttons) Change performance pattern such as habit or routine (grade the task down into a simple perceptual sequence by starting to button at the bottom of the shirt) Change the activity demands or modify the intervention (sewing up part of a button shirt to eliminate buttoning)
Remedial approach	
Sensory-integrative	Repetitive movement sequence with added tactile input, weight, and soft music playing during dressing
Neurodevelopmental	Manual tactile cueing with facilitation and approximation towards midline during buttoning/dressing intervention
Transfer-of-learning	Use a button board or buttoning game before learning buttoning on self

The occupational therapist designs the program for treatment of perceptual deficits, which may focus one approach or combined approaches. The occupational therapist relies on experience, clinical observations, and clinical reasoning skills to measure and report improvement. Research in objective measures for outcomes of treatment methods and progress of perceptual training continues to be explored within the field of OT.[29,58] Evidence-based practice relating to perceptual motor treatment is a continuing priority within the profession.[40,49]

Treatment assigned to an OTA typically involves the functional (adaptive) or transfer-of-training approaches. Other treatment approaches require additional academic preparation and clinical competency, which the OTA may acquire through continuing education.

Adaptive Approach

The **functional approach** (compensatory) is characterized by the repetitive practice of particular tasks that help the patient become more independent in the performance of ADL or IADL. This approach is probably the most common for dealing with perceptual problems. The OTA does not train the patient in specific perceptual functions. Rather, he or she assists the patient to adapt or compensate for the perceptual deficits. The patient becomes aware of the problem and learns compensatory techniques to accomplish the task. For example, if the patient has trouble dressing because of a body scheme deficit, the occupational therapist or OTA may set up a regular dressing pattern/sequence and routine, providing cues with repetitive practice.

Adaptation of the environment, methods, or materials is another way to compensate for a perceptual deficit (Figure 24-1).



Figure 24-1 Food is stored and organized in the same direction and location to accommodate for perceptual deficits.

For example, if the patient is distractible because of visual or auditory figure-ground deficits, the practitioner may arrange for treatment to occur in a quiet, uncluttered room to minimize distractions and create the best environment for learning. If the patient has dressing apraxia, colored tabs can be sewn into clothing to provide cues for top, bottom, inside, and/or outside of the clothing item.[56,58]

Remedial Approaches

The **sensory-integrative approach** is based on neurophysiological and developmental principles. Ayres[7] initially described it as a treatment approach for children with sensory-integrative dysfunction.[28] It assumes that controlled sensory input can be used to elicit specific motor responses. This approach may be impractical for adults because the treatment time to produce desired effects is lengthy. Also, the adult's CNS does not have the same neural flexibility for learning as the child's CNS. Some OT practitioners use modifications and selected techniques from the sensory-integrative approach with adults.[58] Practitioners have applied a multi-sensory input technique coupled with movement demands to retrain the nervous system to respond to sensory or motor stimuli.[46]

The **neurodevelopmental (Bobath) approach** attempts to retrain perceptual functions by assisting the patient in experiencing the sensation of normal movement and the resulting sensory feedback by controlling motor performance. For example, bilateral activities used in the motor retraining program stimulate total body awareness and help to remediate problems of unilateral neglect and homonymous hemianopsia (a visual deficit of the right or left visual field). Weight-bearing, manual facilitation, and tactile cueing to enhance proprioception[58] are important elements of the motor retraining program (see Chapter 22). Practitioners have been combining sensory integrative techniques with neurodevelopmental techniques and reporting success.

The **transfer-of-training approach** assumes that practice in a particular perceptual task generalizes to performance of similar tasks or practical activities that require the same perceptual skills. For example, practice in reproducing pegboard designs for spatial relations training might carry over to dressing skills that require spatial judgment (e.g., matching blouse components to the body, discriminating right from left shoe). This approach was at one time common in OT clinics for treating perceptual problems. However, transfer and generalization are more reliable when functional activities are used throughout. More recently, therapists have used an occupation-based approach in the clinic, easing the transfer of training from the clinic to the patient's home environment.

Treatment of Selected Perceptual Deficits

Astereognosis

Stereognosis is the perceptual skill that enables an individual to identify common objects and geometric shapes through touch, proprioception, and cognition[27] without the aid of vision. Stereognosis is "seeing with the hands" and is basic to the performance of everyday activities, such as finding a key in a pocket.

One treatment approach described by Eggers[15] for **astereognosis** (the inability to identify objects by touch) is summarized in Box 23-1 on p. 439. Farber[17] described a treatment approach to retrain stereognosis in adults and children with CNS dysfunction. First, the patient is allowed to examine the training object visually as it is rotated by the clinician. The patient is then allowed to handle the object in the less affected (or unaffected) hand while observing the hand. In the next step the patient manipulates the object with both hands while looking. Then the object is placed in the affected hand to be manipulated while the patient looks at it. The patient may place the hand in a mirror-lined, three-sided box during these manipulations to increase visual input. This sequence is then repeated with the vision occluded. Once several objects can be identified consistently, two of the objects may be hidden in a tub of sand or rice. The patient is then asked to reach into the tub and retrieve a specific object. If the sensation of the sand or rice is overstimulating or disturbing, the objects can be placed in a bag.[17]

Vinograd and Grossman[45] described a similar program. However, objects for discrimination of shape, size, weight, and texture—as well as common objects—are included in



Figure 24-2 The patient identifies familiar objects verbally or by pointing to the card during intervention for astereognosis.

the training. Wooden blocks are used for shape recognition, sandbags and cotton bags for weight recognition, and different grades of sandpaper and smooth leather for texture discrimination.[45]

Sammons-Preston manufactures a kit in which two dimensional cards and familiar objects can be used for treatment (Figure 24-2). The cards are placed on a ledge of a visual shield while the patient manipulates and identifies the object. This training process can also be done with a manila folder occluding vision.

Body Scheme Disorders

Body scheme is a client factor based on a postural model regarding a person's perception of the body's position and the relationship of body parts to themselves, each other, and the environment.[21] The individual's body scheme is considered the foundation for development of future skills in the perception of environmental space.[57] Body scheme disorder may include unilateral neglect (described in Chapter 10).

The treatment of body scheme disorders can include the functional, sensory-integrative, transfer-of-training, or neurodevelopmental approach, or a combination of these. Using the transfer-of-training approach, the occupational therapist or OTA may touch the patient's body parts and ask the patient to identify them as they are touched. Practice in assembling human figure puzzles and quizzing the patient on body parts during activities are other methods in this approach.[58]

Using a remedial approach, unilateral body neglect can be treated by applying sensory input (rubbing the patient's arm or leg) before dressing. Body awareness can be facilitated through repetitive movement or by a sequence of unilateral and then bilateral stimulation, during which the patient is encouraged to focus on the tactile input to the body. These techniques are used by the occupational therapist or the OTA who has demonstrated competency in facilitation of sensory input.

The therapist or assistant may also engage the patient in activities that focus attention to the neglected side. Examples are placing work materials on the affected side and approaching the patient from the affected side for treatment or conversation. Conversely, using an adaptive or compensatory approach, the clinician may place food, utensils, and work materials on the unaffected side and give all instructions from that side. During personal hygiene and grooming, patients are encouraged to attend to both sides of the body through the use of a mirror or visual and/or oral cues. Repetitive practice and consistent cues are effective treatment methods. Weight-bearing and facilitation techniques in the neurodevelopmental approach can be used to facilitate awareness and movement to the affected side. As unilateral control improves and the patient is aware of the affected side, activities that involve bilateral control and right/left discrimination may be introduced.

Ideomotor and Ideational Apraxia

Ideomotor apraxia (ideokinetic) is an inability to plan or perform a motor skill. The patient may understand the concept, even describe the intended motion and attempt to carry out the task, but cannot execute the motor act at will. Some skills such as waving goodbye may be performed spontaneously but cannot be completed on demand.[14] **Ideational apraxia** is an inability to comprehend the concept of the movement or to execute the act in response to a command or automatically.[21] The distinction between ideational and ideomotor apraxia is often unclear in an individual patient.

Treatment of ideational and ideomotor apraxia is difficult. Use of short, clear, concise, concrete, and repetitive instructions is necessary because this apraxia usually results from a dominant hemisphere lesion, and aphasia is often present as well. The task should be broken down into its component steps, and each step should be taught separately. Verbal and demonstrated instructions may be ineffective; guiding the patient through the correct movements, giving tactile and proprioceptive input with the instruction, may be helpful. Meanwhile brief and concrete verbal instruction can be given. After the patient has performed each step of the task separately, the clinician can begin to combine the steps, grading the complexity and number of steps.[33,56] An example of a complete task is combing the hair. The therapist or assistant can break the task into a motor sequence with or without hand-over-hand guidance: lift comb; bring comb to hair; move comb across top of head, down left side, down right side, and down back; and replace comb on table. Repetition is necessary for effective results.

Constructional Apraxia

Constructional apraxia is a deficit in the ability to copy, draw, or construct a design, whether on command or spontaneously.[21] Constructional apraxia causes significant dysfunction in ADL that require constructional ability, such as dressing, making a bed, folding clothes, organizing food on a shelf, and food preparation.[16,33]

Using a transfer-of-training approach, the patient may practice simple copying and constructional tasks. Guidance, demonstration, and three-dimensional models may be used in treatment. Tasks can be graded in complexity (e.g., use of parquetry designs: colored patterns with full detail, black and white patterns with full detail, colored patterns with partial

detail, and black and white patterns with partial detail).[29] While copying designs, the patient can draw on a clay board or in sand rather than on paper to receive additional proprioceptive input.[58] The use of landmarks in reproducing simple designs may be helpful to patient success.

Neidstadt[31] speculated that techniques to promote generalization lack sufficient variety; thus she recommends the adaptive (functional) approach. Patients with head injuries have demonstrated greater improvement with a functional approach than with the transfer-of-training approach. Occupation-based treatment using the adaptive approach might involve activities such as making a sandwich by following a simple sequence of steps, a recipe, or a sequence of pictures.

Dressing Apraxia

Dressing apraxia is the inability to plan and perform the motor acts necessary to dress oneself. Dressing apraxia often occurs along with constructional apraxia. Treatment involves the occupational therapist or OTA teaching a set pattern for dressing and giving cues that help the patient to distinguish right from left or front from back. The patient is encouraged to look for distinctive features, such as the collar or label, to orient the clothing item correctly. One method is to have the patient position the garment the same way each time, such as laying out a shirt with the buttons face up and pants with the zipper face up, to orient the clothing for dressing. Labels can be used as cues to differentiate the front from the back of the garment. The garment may be color-coded with small buttons or ribbons to distinguish the front from the back or the right from the left side.[56]

When buttoning is difficult for the patient, a pullover or zipper shirt could be suggested, or a buttoned shirt could be partially buttoned and worn as a pullover shirt.[33] Another technique could be to cue the patient to start buttoning at the bottom of the shirt, where the buttons can be aligned visually with the buttonholes. These examples illustrate the adaptive approach to treatment.

Summary of Perceptual and Perceptual Motor Deficits

Understanding the underlying mechanisms and identifying the point of breakdown in a particular action or task are crucial to the effective treatment of apraxia and other perceptual disorders.[26] Activity analysis identifies not only that a patient cannot put on a shirt but also when and where performance breaks down.[55] The remedial or transfer-of-training approach has been used for constructional apraxia, but therapists are now using a functional approach more regularly. A functional or adaptive approach combined with the neurodevelopmental approach is effective for the patient with dressing apraxia. Although at times a single approach may be indicated, more often a combination of techniques or approaches is most effective.[9] The OTA typically uses the functional or adaptive approach but may carry out other aspects of perceptual training as directed and supervised by the occupational therapist and as competency skills are attained.

Treatment of Cognitive Dysfunction

This section outlines basic treatment for deficits in cognitive function. The OTA would not be asked to design a cognitive retraining program; however, he or she may assist in carrying one out. Therefore an understanding of the basic intervention techniques is required.

Treatment Approaches

Various approaches to interventions to help patients with cognitive dysfunction have been proposed in the literature. Methodologies include the adaptive approach, remedial approach, process approach,[1,2] multicontext approach,[41] applied behavioral analysis,[18] sensory integration,[8,59] and cognitive disability approach.[3,4] Occupational therapists may choose to follow a given treatment philosophy or may adopt a more eclectic approach, blending treatment models based on the patient's response. Regardless of the approaches used, effective cognitive rehabilitation must follow logically from deficits in client factors in mental and sensory functions as well as contexts and patterns specific to the individual patient.[5, 50]

The two most commonly used approaches are the remedial and adaptive approaches. The remedial approach utilizes the *transfer-of-training approach* or **cognitive retraining,** through practice, exercises, and stimulation[50] of activities in the deficient areas. Typically these are tabletop, pencil-and-paper, and computer activities. The adaptive approach uses skills that are relatively intact to compensate for skills that are deficient. Treatment activities are client-centered and related to functional, realistic tasks.[28,30]

Remedial Approach

Pencil-and paper and tabletop activities may include worksheets that involve word/letter finds, mazes, math computations/problems, matching symbols across the page, and pegboard replications. These activities are presented with the demand that the patient stay on task and work as quickly as possible. The activity is scored for accuracy; deficits or improvements in the areas of motivation, attention, and concept formation are noted. Additional distractions may be added during the activities to test the extent to which the patient can sustain task attention.

Computer-based activities can be a valuable tool for rehabilitation and provide a means to practice cognitive skills. Cognitive retraining software, such as Captain's Log (Figure 24-3), provide graded treatment modules focusing on areas of cognition. Commercial educational programs and specialized software can be purchased for remediation of arithmetic skills, attention, concentration, concept formation, nonverbal memory, reasoning, association, categorization, cause-and-effect reasoning, problem solving, organization, generalization, level of abstraction, judgment of safety, spatial orientation, sequencing, and verbal memory.[20] Commercial software programs are affordable and easily obtained for the patient to use in the clinic and in a home program. A range of input devices may be purchased or

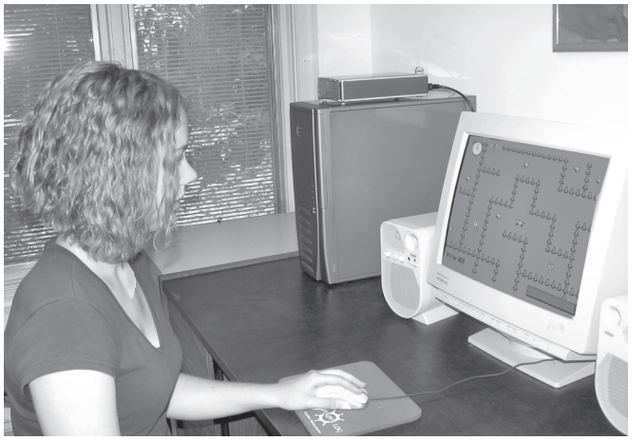


Figure 24-3 Various computer games or activities target cognitive skills such as problem solving, generalization, categorization, and attention. (Courtesy BrainTrain, Inc., Richmond, Virginia.)

customized by the occupational therapist or OTA for use in computer-assisted cognitive rehabilitation (see Chapter 15).

Remedial approaches require repeated and consistent grading in the therapeutic setting. Current studies indicate that paper and pencil tasks such as word puzzles assist in maintaining cognitive skills in the elderly. Paper and pencil tasks can be easily graded in complexity. Studies also support the value of computer programs in reinforcing a cognitive rehabilitation program.[19,23,25]

Adaptive Approach

As previously mentioned, the adaptive approach uses intact skills to compensate for deficits. Variations of the adaptive approach focus on context, activity demands, and performance patterns such as habits and routines.

In providing treatment the occupational therapist or OTA recognizes the context in which the individual will ultimately perform tasks and assists in adapting the situation for performance success. In changing the physical context, the OTA assists in organizing or arranging the environment for minimal distractions to ease task completion. Examples are reducing clutter (Figure 24-4), labeling boxes/drawers, developing a system for paying bills, and using timers (ovens, curling irons, irons, etc.) that shut off devices automatically.

Interventions for the social context focus on reducing or altering demands regarding roles and responsibilities of the patient in relation to members of the family or others while maintaining the patient's participation within existing capacity. A patient who can no longer safely sequence the steps for laundering may benefit from shifting responsibility to another family member. Perhaps the patient could fold the clothes instead. If cooking is no longer safe, then programs such as Meals on Wheels may be an alternative; return to cooking in a graded or adapted form might be possible if cognitive skills improve.

Intervention may focus on establishing routines to enable successful participation. Habits and routines that provide order and consistency in the flow of tasks and activities[22] will reduce demands for decision making by the patient. To assist in establishing routines the OTA may use daily checklists or a filing system (Figure 24-5), provide ADL in a varying manner, or set up the environment for the patient to complete tasks in a predetermined sequence. Consistency over time is needed for a routine to be established. Habits, which are internal automatic behaviors with no conscious awareness, may be produced as a result of routines. As the routine and habits are established, the patient should be able to complete the task with greater ease, accuracy, speed, and function.[32]

Strategies for patients to accomplish tasks may be added to the previously mentioned adaptive approaches. Compensatory strategies or external strategies that OTAs may use during treatment are listed in Box 24-1.



Figure 24-4 **A,** Items on and in the desk are arranged by use, labeled, and clutter-free. This environment assists the patient to maintain or recall the use of various tools for the leisure task of scrapbooking. **B,** Exercise tools and remote controls are stored in the basket near the couch to remind the patient to complete his or her exercises when watching television.

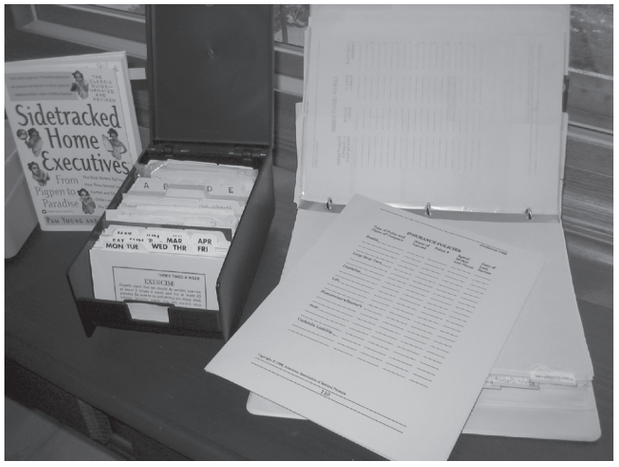


Figure 24-5 A file system listing daily activities and logs of important documents and their location maintains the patient's participation in higher-level cognitive function.

Box 24-1

Compensatory Strategies That Can Be Used During Treatment

For dressing, consistently place garments in the sequence to be donned.
Sew colored tabs to distinguish the front from the back of garments.
Use telephones with memory redial.
Place the telephone list next to the phone.
Use memory devices, such as callback features.
Use day planners (manual or electronic), such as notebooks or Palm Pilots.
Use personal timers, alarm watches, and so on.

Devices for compensatory strategies, such as a timed pill dispenser, may be purchased from medical vendors or from local stores. Compensatory strategies will need to be graded according to the skill level of the patient and may require changes in strategies.

Internal strategies may occasionally be used as mental strategies.[34] The OTA would reinforce memory strategies in the form of visual imagery, mental rehearsal, chunking, association, and repetition.[34,51] These strategies are difficult for many cognitively impaired persons; consequently, **external strategies** are more commonly used.

Principles of Cognitive Retraining

A treatment task can be analyzed and modified in several ways to improve performance.[43] Such modification is usually called *providing structure*. Treatment activities can be graded by changing the parameters of the task, which include the environment, familiarity with the task, directions given for completion of the task, number of items, spatial arrangement of the items, and the required response rate. Various environmental cues can be set up in the person's work area to stimulate recall (see Figure 24-4).

During treatment, the occupational therapist systematically provides verbal and physical cues through interpersonal interaction and modifies cuing according to the patient's response. Cues can be used to direct attention to a particular aspect of a task, to guide problem solving, and to facilitate recall. Examples of cues are repetition ("try again"), analysis ("what do these objects have in common?"), and direction of attention ("look here on your left").[43] The occupational therapist or OTA must always be aware that the ultimate goals of treatment are for the patient to internalize the cues, thus grading or reducing the need for external or environmental cueing for successful performance.[13,59]

The goal of therapy is to progress from using external cues designed by the clinician to using internal and external cues independently established and maintained by the patient. A group approach that empowers the patient to guide the treatment process has also been shown to be effective.[35]

The concepts of generalization and transfer of learning are also critical to learning new skills. **Transfer of learning** refers to the application of information learned in one situation to another similar situation. **Generalization** refers to the ability to apply learned knowledge and skills to a variety of similar but novel situations.[34] Individuals with cognitive deficits often have difficulty with transfer of learning and may be unable to generalize skills to novel situations. Opportunity to practice transfer of new skills must be built into treatment.

Technology and research have expanded the range of training activities available on the medical and general markets, thus offering the occupational therapist and OTA team a variety of treatment tasks and ideas.[12,13,44,59]

Treatment of Specific Deficit Areas

Orientation Functions

Staff and family members who come into contact with the patient can assist in **orientation** to person, place, time, self, and others.[6] They should attempt to reestablish orientation as often as possible. External aids, such as calendars, bulletin boards, and "orientation boards" with pertinent information such as the facility's name, the date, the season, and current events, are often used in rehabilitation centers. An orientation group can be scheduled to meet at the start of each day to review the day's upcoming events and the previous day's occurrences.[24]

Attention Functions

The initial goal of treatment for **attention** dysfunction is to identify the optimal environment that enables the patient to attend for the longest time. As attention and concentration improve, the span of time and complexity of the activity should be increased. Grading the activity levels from a low-stimulus environment to an environment with more activity should occur as tolerance increases. Formalized attention training models have been previously discussed and are available.[10,34,38]

Memory Functions

Because cognitive deficits typically reduce flexibility in adapting to various teaching approaches, clinicians try to present new information in the way that is most efficient for the patient. First, the clinical team (psychologist, speech-language pathologist, other team members) attempts to identify the patient's optimal learning style.[36,48] A person's learning style can be identified by observing responses to instructions (e.g., verbal, written, demonstrated, diagrammatic) given for various standardized tests and functional activities as well as by evaluating data obtained from standardized **memory** assessments.

As the characteristics of the optimal teaching methods become apparent, this information can be communicated to the patient, the team, and the patient's family. Once the patient can be made aware of the preferred style, he or she may learn to request that new information be provided in the preferred way. The OTA may contribute to the identification of learning style by carefully observing the patient's response during ADL and treatment.

The patient's learning style will suggest which strategies will assist memory of steps and facts. Internal strategies may be employed if the patient exhibits concentration and attention to task. Otherwise, the clinician may provide external strategies or compensatory strategies such as verbal reminders, signs, cue cards (see Figure 24-5), notebooks, written instructions, electronic memory aids (e.g., alarm watches), and computer data storage units, such as Palm Pilots.[34,52]

The OTA may focus intervention on generalization or transfer of learning to different situations, always assessing whether the patient is performing the tasks in a safe manner. An example is focusing on safety with electrical appliances near the sink/water in the OT kitchen on the unit. Transfer of learning occurs when the patient transfers the safety techniques to using an electric razor or curling iron near the sink/water in the bathroom in the home environment.

Domain-specific learning is used for the patient who has global memory deficits. The patient with global memory deficits can learn new skills in a particular situation but cannot transfer the learning process and skills attained to a new environment.[37] An example is the patient who is taught one-handed cooking skills in the OT department's kitchen but cannot generalize those skills to the home environment. It may be better to instruct the patient at home.

Job coaching, a type of supported employment in which OTAs may provide services, is also based on this premise. The skills needed for the job are taught to the patient at the job site.[47]

Higher-Level Cognitive Functions

Higher-level cognitive functions **(executive functions)** include cognitive abilities in the areas of judgment, concept formation, time management, problem solving, and design making.[6] The patient's level of awareness of the higher-level cognitive function deficits will determine the direction of the treatment approach. At one extreme is the patient who is aware of the problem and recognizes, comprehends, and realizes the impact of the deficit. This patient may respond to internal strategies for self-monitoring or to environmental compensatory cues. For example, the patient may develop a jingle to assist in organizing information or keep a notebook, calendar, to-do-lists, and other reminders to stimulate activity.

At the other extreme is the more severely impaired patient who denies the deficit. Such a patient may require supervision by another individual. A family member or significant other may be trained to set up a daily routine, provide the verbal prompting, and maintain the system of environmental cues previously established.

The focus of intervention for higher-level cognitive functions is to increase the patient's ability to reason and solve problems. The OTA should model and help the patient to use a sequence of problem-solving steps when providing interventions to maintain or improve executive functions:

1. Define the problem.
2. Develop possible solutions.
3. Choose the best solution.
4. Execute the solution.
5. Evaluate the outcome.

The patient can learn this sequence along with instructions to follow the steps when a problem is encountered in therapy or in functional tasks.[11,53] The OTA can assist the patient in transferring and applying this technique to a variety of situations within the context of treatment.

Awareness

Awareness can be further addressed in treatment using the following approaches.[42] *Self-estimation* can be encouraged by asking questions or viewing pictures of tasks/safety issues that require the patient to predict the outcome of the question or task. The practitioner and patient also can reverse roles within the context of treatment to make the patient aware of safety issues. Intervention may focus on the patient's ability to question and evaluate performance.

Behavioral Problems

A deficit in higher-level cognitive functioning may result in behavioral problems due to the patient's lack of judgment and deficient problem-solving abilities. These deficits typically are associated with persons who have experienced head traumas. Behavioral management strategies control and restrict behavioral outbursts. Staff members will need to give consistent, patient-specific, direct feedback regarding the inappropriateness of the behavior. If the patient's level of insight and control warrant, internal strategies (such as personal time-out or actively removing oneself from the situation) can be taught. If this approach fails, external controls may be used. In this case a staff member may need to escort the patient to a quiet area until behavioral control is once again established. The staff member must remain calm and provide consistent verbal cues related to the situation. A strong emotional response from the staff can exacerbate the situation.

A group approach can also be useful in providing feedback from peers.[24] Videotaping can provide a visual record of behavior that can be discussed with the patient so that he or she can use internal techniques to control the behavior.

Summary

Cognitive dysfunction is complex and requires the OTA to develop astute observational skills, provide consistent cues and structures, and attain knowledge and understanding of the underlying principles. Evaluation and design of treatment for cognitive deficits are the occupational therapist's responsibility. The OTA can contribute in this area by carefully observing patient behavior and by applying the general treatment principles and techniques discussed. The OTA is encouraged to obtain continuing education and clinical experience and competency to refine therapeutic skills in dealing with patients with cognitive dysfunction.

Selected Reading Guide Questions

1. Compare and contrast the roles of the occupational therapist and the OTA in the treatment of patients with deficits in performance skills.
2. Contrast remedial and compensatory intervention techniques.
3. Explain how astereognosis would affect a daily functional skill, and suggest intervention techniques that could remediate that skill.
4. Give examples of activities and strategies used for the patient with unilateral neglect.
5. Describe in detail how to teach a patient with ideational and ideomotor apraxia to brush his or her teeth.
6. Plan two different activities that can be used to treat the patient with constructional apraxia.
7. Describe how to lay out clothing for a patient with dressing apraxia.
8. Explain what is meant by "providing structure" for the patient with cognitive deficits.
9. Describe how the physical context would affect the intervention approach of patients with cognitive deficits, and give two examples of the intervention that would take place.
10. List three activities and strategies used for patients with problems in orientation.

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