OBJECTIVE: The purpose of this study was to examine the effects of partnerships between people with disabilities and service dogs on functional performance and social interaction.

METHOD: A single-subject, alternating treatment design was used. The participants were 3 women with mobility challenges who owned service dogs. For each participant, time and perceived amount of effort for two tasks were measured for functional performance. Interaction and satisfaction levels were measured for social interactions.

RESULTS. Primary findings were that service dog partnerships decreased performance time for four of the six tasks, decreased effort for five of the six tasks, increased social interactions for 2 of the participants, and increased levels of satisfaction with social interactions for all participants.

CONCLUSION. For adult women with mobility challenges, service dog partnerships may contribute to energy conservation through decreased time and effort required to complete some tasks and may increase social interactions.


The benefits of service dogs for people with disabilities have become more recognized since the passing of the Americans With Disabilities Act of 1990 (ADA; Pub. L. 101–336). According to the ADA 2010 Revised Requirements of Service Animals, service dogs are working animals trained to assist people with disabilities to perform tasks, and they are allowed to accompany people with disabilities in all areas of the community in which members of the public are allowed. Moreover, service dogs have been used to assist people with mobility and balance issues, alert people with medical conditions such as diabetes or seizures, and support people with psychiatric disabilities (Assistance Dogs International, 2008). Dogs are commonly used as service animals because they have been found to provide important social–emotional support (Allen & Blascovich, 1996; Fairman & Huebner, 2001; Rintala, Sachs-Ericsson, & Hart, 2002) and have the potential to learn skills that can assist people with activities of daily living (ADLs; Fairman & Huebner, 2001; Rintala, Matamoros, & Seitz, 2008).

According to the Occupational Therapy Practice Framework: Domain and Process (2nd ed.; American Occupational Therapy Association [AOTA], 2008), occupational therapy practitioners work with people of all ages who, because of injury, illness, or aging, have limitations in daily task performance. Additionally, “occupational therapy involves facilitating interactions among the client, the environments or contexts, and the activities or occupations in order to help the client reach the desired outcomes that support health and participation in life” (AOTA, 2008, p. 647). One way practitioners can facilitate these
interactions for people with limitations in daily task performance is through the use of service dogs. Occupational therapy practitioners have advocated for service dogs as an assistive technology option because they can increase independence in daily tasks for people with disabilities and help avoid some of the pitfalls of traditional assistive devices, such as a high abandonment rate (Winkle & Zimmerman, 2009). Analyzing people’s performance skills to understand the factors that support or hinder engagement in occupations is within the scope of occupational therapy practice (AOTA, 2008).

Existing research has addressed the benefits of the use of service dogs for people with various physical disabilities. Positive effects of service dogs on the psychological well-being of people with mobility challenges have been found. This research has documented beneficial aspects of service dog partnerships, including enhanced self-esteem, increased happiness, acceptance of disability, and increased support and companionship, as well as decreased loneliness (Allen & Blascovich, 1996; Fairman & Huebner, 2001; Rintala et al., 2002).

Social participation for people with disabilities is an important consideration for occupational therapy practitioners. Research regarding social opportunities for people with mobility challenges has shown that having a service dog both increased leisure pursuits and community participation and increased participation in school and employment (Allen & Blascovich, 1996; Rintala et al., 2002). This research has demonstrated increases in social greetings and approaches toward people with service dogs and a lower incidence of people avoiding people with disabilities when a service dog was present (Hart, Hart, & Bergin, 1987; Valentine, Kiddoo, & LaFleur, 1993). Also, people smile and converse more readily with people who have service dogs than with people without them, regardless of the person’s age (Eddy, Hart, & Boltz, 1988; Mader, Hart, & Bergin, 1989).

Service dogs have also been found to be useful in assisting people with disabilities with functional performance and self-care tasks. For example, trained service dogs can open doors, retrieve items, assist with home and community mobility, and alert others in emergency situations (Fairman & Huebner, 2001; Lane, McNicholas, & Collis, 1998; Rintala et al., 2008). Moreover, research has shown that service dogs are able to assist people with ADLs such as dressing, personal grooming, bathing and showering, feeding and eating, toileting, and oral hygiene (Fairman & Huebner, 2001). Because service dogs may decrease the amount of assistance required by human caregivers (Allen & Blascovich, 1996; Fairman & Huebner, 2001), people with disabilities may develop a sense of independence from having more personal control over daily tasks.

It is important to note that although the literature has shown promising outcomes for the therapeutic use of service dogs, 12 studies evaluated in a systematic review by Winkle, Crowe, and Hendrix (2012) presented concerns related to the quality of the research designs. The studies evaluated included 1 Level II study, 6 Level III studies, 4 Level IV studies, and 1 Level V study using the American Academy of Cerebral Palsy and Developmental Medicine (AACPDM) five-level evaluation system (Darrah, Hickman, O’Donnell, Vogtle, & Wiart, 2008). According to the systematic review, 11 studies did not receive higher than a “weak” rating on the AACPDM 7-point quality scale (Darrah et al., 2008). One study (Allen & Blascovich, 1996) received a moderate score. The main concerns with the quality of studies reviewed included the poor intervention descriptions, small sample sizes, insufficient methods used to control variables and limit biases, and inability to use blind assessments (Winkle et al., 2012).

More research needs to be conducted to add to the current evidence of the effectiveness of using service dogs to assist people with disabilities. The long waiting periods for professionally trained service dogs (typically 2–5 yr) speak to the interest of many people with disabilities who would like the opportunity to benefit from the interventions offered by service dog partnerships (Sachs-Ericsson, Hansen, & Fitzgerald, 2002; Thinking Outside the Box, 2013; Winkle & Zimmerman, 2009).

Given the interest of people with disabilities in the use of service dogs, the general support in the literature for the use of service dogs, and the identified need for carefully designed research to examine the effects of this intervention, we designed this research to study the use of service dogs partnered with people with mobility challenges. We addressed two research questions: (1) What are the effects of service dogs on functional performance as measured by time and perceived effort to complete two individualized tasks, and (2) what are the effects of service dogs on social interaction in the community as measured by amount of interaction and satisfaction level?

Method

Research Design

We used a single-subject alternating-treatments design (Barlow & Hayes, 1979; Deitz, 2006) to compare the effects of two treatments or conditions. The two conditions compared in this study were (A) without and (B) with the service dog. For the 6 consecutive weeks of
data collection (12 days), these conditions were randomly assigned in two blocks of 6 days for each participant. For example, data could be collected in the following sequences: AABABBABAB or BABBAABABAAB. Each data collection session included a home or office visit (functional performance segment) and a grocery store visit (social interaction segment), the order of which was also randomly determined. All randomizations were designated before the initial meeting. The University of New Mexico Human Research Protections Office (HRPO) approved this study, and participants completed the HRPO consent form before data collection.

Participants

The study sample included 3 female participants ages 47 yr (Participant 1), 63 yr (Participant 2), and 23 yr (Participant 3) with a diagnosis of limb girdle muscular dystrophy, spinal cord injury, and cerebral palsy, respectively. Two participants were non-Hispanic White (Participants 1 and 3) and 1 was Native American and White (Participant 2). Table 1 describes the demographics of the 3 participants. All 3 participants met the established inclusion criteria; they had to (1) be ≥18 yr old; (2) have a physical disability that required the use of power mobility; (3) be cognitively able to participate in data collection, which was informally evaluated during the first session; (4) have a service dog trained by Assistance Dogs of the West (ADW; Santa Fe, NM); (5) live in the greater Albuquerque or Santa Fe area; and (6) be willing to participate in the study.

ADW in Santa Fe, New Mexico, helped recruit participants for this study. ADW sent a letter to possible participants, and the 3 people who responded were referred to us.

Instruments

Two forms were designed to collect the data needed for functional performance and social interaction. The Functional Performance Form was designed to document two different tasks that the participant could complete independently or with the assistance of the service dog. The form was used to record exact starting and stopping points for each task, time required to complete each task, perceived level of effort, time of day, and comments. A numerical Likert scale was used to record each participant’s perceived level of effort and ranged from 1 (least amount of effort) to 10 (maximum amount of effort).

The Social Interaction Form measured three different types of interactions while shopping. Interactions were (1) conversations, (2) passing verbal greetings, and (3) stopping to pet the dog. All three interaction types were combined in the total number of social interactions. Two interaction marks were used when the participant was not with the dog (Interactions 1 and 2), and three interaction marks were used when the participant was with the dog. The form was also used to measure the perceived level of satisfaction with each shopping experience on a scale ranging from 1 (least satisfied) to 10 (highly satisfied). If the dog was not present, participants were asked whether they felt the amount of social interaction would have been different if the dog had been present.

Table 1. Characteristics of Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Participant 1</th>
<th>Participant 2</th>
<th>Participant 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>47</td>
<td>62</td>
<td>23</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Limb girdle muscular dystrophy</td>
<td>Spinal cord injury; paraplegic</td>
<td>Cerebral palsy</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Non-Hispanic White</td>
<td>Other (Native American and White)</td>
<td>Non-Hispanic White</td>
</tr>
<tr>
<td>Marital status</td>
<td>Divorced</td>
<td>Married</td>
<td>Single</td>
</tr>
<tr>
<td>Who resides in home of participant</td>
<td>Lives alone</td>
<td>Husband and son</td>
<td>Lives alone</td>
</tr>
<tr>
<td>Employment status</td>
<td>Employed full time</td>
<td>Retired</td>
<td>Student</td>
</tr>
<tr>
<td>Highest education completed</td>
<td>Graduate school (master of library and information science)</td>
<td>Graduate school (MA, education/special education), PhD candidate in special education</td>
<td>3 yr of college</td>
</tr>
<tr>
<td>Services in the home</td>
<td>Housecleaner 2×/mo; gardener 1×/wk; attendant 2×/wk</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Mobility aids</td>
<td>Power chair</td>
<td>Power chair</td>
<td>Scooter and crutches</td>
</tr>
<tr>
<td>Leisure activities</td>
<td>Swimming, movies, eating out, painting, drawing, reading, walking dog, volunteering, and spending time with friends</td>
<td>Crafting, volunteering, reading, traveling, going to the gym, vice president of small organization, Buddhist activities, gardening, caring for pets, movies, and cultural activities</td>
<td>Swimming, reading, movies, writing, shopping, and eating out</td>
</tr>
<tr>
<td>Typical amount of social participation in a week</td>
<td>4 hr daytime and 15 hr nighttime</td>
<td>32 hr daytime and 7 hr nighttime</td>
<td>2 hr daytime and 1 hr nighttime</td>
</tr>
<tr>
<td>Dog age and breed</td>
<td>7-yr-old Labrador retriever</td>
<td>7-yr-old golden retriever/Labrador retriever</td>
<td>5-yr-old golden retriever</td>
</tr>
<tr>
<td>No. of years owned dog</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

March/April 2014, Volume 68, Number 2
Momentary time sampling (Deitz, 2006) was used to record interpersonal interactions during the sessions with and without the dog present. The data collectors listened to a recording device (Olympus Digital Voice Recorder VN-6000, Olympus Corp., Shinjuku, Tokyo, Japan) that was programmed to beep every 10 s for 15 min (90 data points). The data collectors maintained a distance between 10 and 15 ft behind the participants and documented on the Social Interaction Form whether the participants were socially interacting at the moment each beep occurred. After the 15-min session, the data collectors asked the participants the questions on the Social Interaction Form.

Procedures

ADW defined the service dog intervention. The skills taught to the dog include basic obedience, navigational skills, task training, and public access and appropriate behavior in multiple environments. On average, each dog trained through ADW receives 20 hr/wk of training over a minimum of 78 wk. After an extensive placement process between a person with a disability and the service dog, both attend a 2-wk intensive training course. During the training course, the person learns handling techniques, a list of commands with approximately 90 cues that the dog has learned, and specialized cues for the person’s specific needs. Also, people working with their service dogs participate in public access training and sessions on health and safety for dogs and take written and practical tests.

The principal investigator (PI; Terry K. Crowe), four graduate students, and one undergraduate student collected data for this study. Participants met with the PI and either one or two data collectors before data collection to complete the HRPO consent form and demographics form and to determine a schedule for the 6-wk data collection process. Throughout the study, the PI used the Procedure Checklist form to maintain procedural reliability among all five data collectors (Billingsley, White, & Munson, 1980). The Procedure Checklist form included introduction and setup procedures, a functional performance task and stopwatch protocol, and a grocery store and recording device protocol.

Functional performance was assessed in each participant’s home or office space and focused on two tasks chosen by each participant that could be done independently or with the assistance of the service dog. Exact starting and stopping points were determined depending on the chosen task. Stopwatches were used to measure the amount of time for each task to the nearest 10th of a second. All 3 participants chose picking an object up from the floor as one of their tasks. Participant 1 picked up her keys from the floor 1 ft from her wheelchair while remaining seated. Timing began when she initiated movement by leaning to grab the keys and ended when she placed the keys in her lap. With the dog, timing began when the dog was given the command to pick up the keys and ended when the keys were in the participant’s lap. Participant 2 picked up a fanny pack from the floor approximately 2 ft away and placed it in her lap while seated in her wheelchair. Timing for both with and without the service dog began when the fanny pack hit the floor and ended when the fanny pack was placed in the participant’s lap. Participant 3 chose picking a pen up off the floor 1 ft away from a chair. This task consisted of her physically getting out of her scooter and onto the floor (hands and knees) and then getting back into her scooter with the pen. The timing for both with and without the service dog started when the pen hit the ground and ended when the pen was placed on a desk in front of the participant. Placement of objects for all 3 participants was consistent across the 12 data collection sessions.

The second functional performance task differed among the 3 participants. Participant 1 chose opening her office door. Opening the door consisted of either the participant pulling open the sliding glass door or her dog tugging at a rope attached to the sliding door until it was fully open. Timing started when she or her dog passed a specified mark on the wall and ended when the door was fully opened. Participant 2 chose to retrieve a cell phone from a windowsill approximately 8 ft away. Timing without the dog started when the front wheels of the participant’s wheelchair crossed over a specific brick on the kitchen floor and stopped when the front wheels crossed back over the same brick. When the participant used her service dog for this task, timing started when the dog’s front paws crossed over the same brick on the kitchen floor and stopped when the cell phone was in the participant’s lap. The front wheels of the participant’s wheelchair were located at the same kitchen floor brick when the dog was performing the task. Participant 3 chose the task of picking up a dog dish off the floor. Without the dog, this task began with the participant standing in front of the sink with the support of the counter and consisted of the participant walking with support along the counter, bending down to get the bowl, getting back up, walking with support back to the sink, and placing the bowl in the sink. Timing started when she took her hands off the sink and stopped when the floor was placed in the sink. With the dog, timing started when the participant gave the first command to the dog to get the bowl and stopped when the dog dropped the bowl in the sink.

Social interactions were observed at three different grocery stores. These stores were different from each participant’s usual shopping sites to eliminate bias resulting from possible familiar interactions in the stores they typically used. Participant 1 visited a grocery store chain,
Participant 2 visited a local Mexican-themed grocery store, and Participant 3 visited a discount store–grocery store combination. Visits to the store occurred within a 1-hr window of the initial visit. For example, if the initial visit was done at 6:00 p.m., all of the following sessions were conducted between 5:00 and 7:00 p.m. to control for the variant flow of traffic throughout the day and to ensure that fluctuations in the amount of business in the store would not interfere with the results.

Reliability

Before beginning data collection, an acceptable interrater agreement of ≥90% was established between each of the five data collectors and the PI. The PI trained the data collectors on data collection procedures for the functional performance and social interaction components of the research. The PI continued training the data collectors until the percentage of agreement for the social interaction portion was at the minimum level of 90% for documentation regarding number of interactions. The functional performance interrater agreement was determined to be within 1 s of the amount of time it took the participant or the dog to perform each task. Across the 12 data collection sessions, interrater agreement of at least 90% was maintained between the data collectors and the PI before the initial data collection and again during the 1st, 6th, and 12th sessions. Additionally, procedural reliability was checked for each of the five data collectors on the Procedure Checklist form during the 1st, 6th, and 12th visit.

Results

**Functional Performance**

Figure 1 shows the amount of time and perceived level of effort used for the functional task of picking up an object (keys, fanny pack, and pen) from the floor for each participant with and without the dog. Figure 2 shows the amount of time and perceived level of effort used for the other functional tasks (open a door, retrieve a cell phone, and pick up a dog dish from the floor) for each participant with and without the dog. The results showed a decrease in the time taken to perform four of the functional tasks and no meaningful difference in time for two of the functional tasks when the service dog was present. Additionally, the perceived level of effort decreased for five of the six functional performance tasks when the service dog was present.

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**Figure 1.** Duration (s) and perceived effort of picking up objects from the floor for all 3 participants with and without their service dogs.
Social Interaction

Figure 3 shows the number of data points reflecting social interactions experienced during each grocery store visit for each participant with and without her service dog. Of the 3 participants, 2 (Participants 1 and 3) had an increase in social interactions when the service dog was present.

The average perceived satisfaction level for each participant was determined using a 10-point scale (1 = highly dissatisfied, 10 = highly satisfied). Participant 1’s level was 6.0 with the dog and 2.5 without the dog; Participant 2’s level was 9.0 with the dog and 2.5 without the dog; and Participant 3’s level was 5.8 with the dog and 3.5 without the dog. All 3 participants also noted that they believed that each time they shopped without the dog, having the dog present would have made a difference in social interaction 100% of the time.

Discussion

This study demonstrated that 3 adult women who use powered mobility and service dogs benefited from these service dog partnerships. The primary findings were that using a service dog decreased the amount of time needed for functional tasks for 2 of the 3 participants; decreased participant-reported effort for five of the six functional tasks studied; increased the perceived level of satisfaction for all participants; and increased social interactions for 2 of the 3 participants. These findings suggest that one intervention occupational therapy practitioners should consider for adult women with mobility challenges is the use of service dog partnerships.

Functional Task Duration

The use of a service dog for functional tasks resulted in a substantial decrease in task duration for four of six tasks. Participants 2 and 3 spent an average of 1.5 to 2 times longer completing tasks alone than with the dog’s assistance. Our results for functional task performance are in alignment with past research that has shown that service dogs are often used to retrieve out-of-reach items (Fairman & Hueber, 2001; Lane et al., 1998; Rintala et al., 2008). For Participant 1, both functional tasks took approximately the same amount of time with or without the dog. A possible explanation for this finding is the type of door (a sliding glass door) that was used for the functional task. If another, more challenging type of door, such as a hinged door, had been used, the results might have shown a difference in time.
The participants stated that the effort needed to complete the functional performance tasks was less with the assistance of the service dog for five of the six functional tasks examined. One participant rated the task of retrieving a cell phone from a windowsill as requiring the same amount of effort with or without the dog. This task required very little body movement and therefore was not a task that required substantial effort to complete.

In contrast, for the five tasks for which the participants reported less effort to complete, the data points for each of the participants when using the service dog were substantially below those when not using the dog, thus clearly indicating reduced perceived effort and suggesting that the use of service dogs may decrease daily fatigue levels through less time and effort to perform some daily tasks. In a study done by Kinne, Patrick, and Doyle (2004), 45% of the adults with disabilities interviewed in their study reported having extreme fatigue. Malone and Vogtle (2010) discovered that fatigue was a major inhibiting factor interfering with the ability of adults with cerebral palsy to participate in daily life. By lessening the cumulative effects of fatigue caused by engagement in multiple tasks repeated throughout the day, people with disabilities may be able to participate in more meaningful occupations of daily living and leisure pursuits.

**Number of Social Interaction Data Points**

The presence of the service dog resulted in a greater number of data points reflecting social interactions for 2 of the 3 participants over the 12 sessions. Participants 1 and 3 experienced a much higher number of social interaction data points when their dogs were present than when they were alone. Participant 1’s median number of interaction data points was 6.5 with the service dog compared with 1.0 without the service dog. Additionally, Participant 3’s median number of interaction data points was 5.5 with the service dog compared with 1.0 without the service dog. For Participant 3, the number of social interaction data points was higher for all sessions when the dog was present than for any of the sessions without the service dog. Still, the total number of social interaction data points was relatively small for all participants.

While grocery shopping, the participants were often observed to be intent on finding items rather than socializing with fellow shoppers. Also, some people may be hesitant to approach a working service dog in this setting out of respect for or confusion regarding proper etiquette. Retrieving Independence, a nonprofit organization and member of Assistance Dogs International, has stated that service dog etiquette includes not distracting the service dogs with greetings, disturbing the privacy of the working team, or doing anything to interrupt the dog in its duties (Retrieving Independence, 2010). Service dogs, including the three dogs in our study, wear vests to alert the public not to approach or distract the dog. A public service announcement video, “Don’t Disturb the Ones Working” (Assistance Dogs International, 2008), urged the public to not disturb a service dog once its vest is on, indicating that the dog is working. It is unclear how the public’s perception affected the social interaction data. Also, 2 of 3 participants showed an increase in social interaction data points during the last two sessions at the store with their dog present, which may
indicate that a familiarity effect occurred. Store patrons or employees may have recognized the participant, the team may have gained more comfort with the surroundings, or both.

Social Interaction Satisfaction

All participants rated much higher satisfaction with social interactions when the service dogs were present. In every instance when the dog was not present, each participant thought her satisfaction level would have been different if the dog had been present. In the study by Eddy et al. (1988), participants using wheelchairs frequently reported that they felt invisible in public, such as being ignored or avoided. Therefore, a service dog may facilitate more social interactions by increasing the approachability of people with mobility challenges (Rintala et al., 2002). This increase in approachability may enhance the level of satisfaction with interactions by allowing people using wheelchairs to feel as though they are not being ignored in public.

Strengths and Limitations

This study had four primary strengths. First, the service-dog and no-service-dog conditions were randomized, controlling for changes that occur over time. Second, procedural and interrater reliability checks were performed throughout the study. Third, data were collected in controlled settings and in the natural environment (grocery store), allowing for more realistic social interactions. Fourth, each participant’s behavioral responses were tracked individually over multiple data collection sessions (Deitz, 2006).

The primary limitation of this study is the degree to which the results can be generalized. The social interaction data were collected only in grocery stores in the Albuquerque area, and the extent to which regional customs affected the results is unknown. Also, all of the participants in this study were women, and all had previous experience with their service dogs, thus limiting the generalizability of the findings.

Implications for Future Research

To increase the generalizability of the findings, this research needs to be replicated with a variety of people, such as adult men and children with mobility challenges, and should examine the effects of this intervention on a wider range of functional tasks. Moreover, social interaction should be examined in a variety of settings such as spectator events, shopping malls, and restaurants. The design of future research should include a qualitative component focused on expanding understanding of participant satisfaction and studying participants as they transition from not having a dog to having a dog. This component could provide insight into factors such as the extent to which having a dog before starting the study influences perceptions, how perceptions change over time, and why the participant who experienced similar amounts of social interactions with and without the dog reported much more social satisfaction when the dog was present.

Implications for Occupational Therapy Practice

The results of this study indicate that service dogs may increase independence for people with mobility challenges. Occupational therapy practitioners can help facilitate these partnerships in several ways:

- Practitioners’ role may include assessing meaningful occupations with which a person would like the service dog’s assistance, evaluating the person’s abilities and needs, and integrating the service dog into the person’s daily life (Winkle & Zimmerman, 2009).
- Practitioners may recommend the use of service dogs as an assistive device option for people with disabilities to increase community integration, social interaction, and energy conservation through decreased time and effort required to complete some tasks.
- Practitioners can provide modifications to common items such as leashes, dog doors, or feeding equipment to assist the person in caring for the service dog (Winkle & Zimmerman, 2009).

Conclusion

The purpose of this study was to determine the effects of service dogs on the functional performance and social interactions of people with mobility challenges using a single-subject design. Service dogs were shown to help people with mobility challenges perform functional tasks in their home or office with less time and less effort. When service dogs were present during grocery store trips, participants reported higher rates of satisfaction with their social interactions, and an increase in the number of social interaction data points was observed for 2 of the 3 participants. Future research is needed to add to the evidence for the effectiveness of service dog partnerships.

According to the Framework (AOTA, 2008), participation occurs when a person is actively involved in carrying out or directing the actions necessary to perform the occupations or daily activities he or she finds meaningful or purposeful. Participation is a specific outcome of occupational therapy intervention. The use of service dogs by people with mobility challenges may allow people to participate more in the occupations they find meaningful.
Occupational therapy practitioners can enrich these partnerships by assessing the strengths and barriers of people with mobility challenges and assisting with the integration of service dogs into their daily lives. ▲

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References


