

BY SHOSHANA SHAMBERG, O.T.R./L.,
AND AARON SHAMBERG, M.L.A.

ACCESSIBLE HOME

Faced with the reality that their son, Jason, had cerebral palsy, Harriet and John Fisher decided to create an environment in which he could operate as independently as possible. Jason's cerebral palsy resulted in fluctuating tone, uncontrolled movements of extremities, poor balance and difficulty with fine-motor movement of his arms. He requires assistance with feeding, dressing and toileting. He possesses above-average intelligence, good verbal and problem-solving skills, and excellent computer skills.



A wide ramp and doorway allow Jason, here with his mother and one of the authors, Shoshana Shamberg (kneeling), to easily enter and leave his home in his wheelchair.

The Fishers, both of whom are engineers, decided to build a new house to accommodate Jason's needs as a person with a disability. They hope he will be able to live on his own some day, and they wanted to plan the new house to work toward that goal. For example, in the future, a section could be turned into a separate apartment for Jason for transitioning from home to independent living as he reaches college age and adulthood. His parents also wanted him to be able to go outside independently for visits with friends or play, or to leave in case of emergency.

BUILDING AN ACCESSIBLE HOME

To assist them in designing their new home, the Fishers hired Abilities O.T. Services, Baltimore, as an accessibility consultant to conduct an in-depth functional and environmental evaluation. Shoshana Shamberg, O.T.R./L., spent several hours observing Jason and his mother performing typical daily activities such as toileting, dressing, meal preparation, eating, watching TV, reading, working at the computer, and generally moving throughout the home.

Jason can move through his home crawling on his knees; walking by holding on to the walls and furniture for support; or using his wheelchair. He does not like to use his walker. He recently began using electrical stimulation to obtain greater muscle control for walking and sitting, with early positive results.

Jason has Kushall manual and Invacare Jaguar power wheelchairs. He can transfer independently to and from a child-size chair and table. However, due to the height of a regular tabletop, he requires assistance and an adaptive chair with footrests and side supports at the computer station and kitchen table. He is able to operate the TV remote control unit with some difficulty. His fluctuating tone and decreased muscle control are not easily controlled, often causing him to push the wrong button or activating it too many times. Jason's mother assists him in his dressing and toileting activities.

Through observation, Abilities O.T. Services targeted functional problems in performing these activities and the environmental barriers impacting his ability to be as independent and as safe as possible. For example, Jason tried to retrieve a snack from the kitchen pantry and he could not reach the sink, access the refrigerator or carry items from one place to another. His mother had to set up the snack and place him in his chair. He could drink from a straw, but the container had to be firmly placed on the table.

The suggested environmental changes fell into eight categories: parking and driveways; exterior entrances; hallways, living room and dining room; interior stairways; kitchen; bathroom; bedroom; and safety and security. For each area of the home, suggestions included manipulation of the environment, specialized products and assistive technology, accessible/barrier-free design ideas, and environmental modifications. The primary consideration, of course, was for the Fishers to choose a site and neighborhood that was graded for safe and easy access to school bus stops with wide sidewalks, flat terrain and curb cuts.

Parking and Driveways

The curb cuts should be 4 feet wide or greater with a maximum 1:12 slope and nonslip surface. Motion detectors that trigger low-voltage light should be installed along the driveway and walkways to ensure safe access in the dark. Parking and the driveway location should allow adequate room for the Fishers' car to pull up to the house and to access at least one entrance, especially if using Jason's wheelchair.

Exterior Entrance

The walkways need to have a smooth, unobstructed, continuous surface. They should be at least 48 inches wide, with no more than a 5-percent slope, and made of a nonslip surface. The sloping portion should have a level platform at the top and bottom with a 5-foot-by-5-foot area for Jason to turn around.

The ideal situation would be to have at least one no-step entrance leading into the home. If a ramp is needed, it should have a slope no steeper than 1:20 and, since this was in the Baltimore

area, a cover to protect Jason from the weather. If handrails are needed on the ramp or steps, they should be installed 32 inches high from the ground and extend 12 inches beyond the top and bottom of the ramp or step. Another option would be to install a wheelchair lift for access to a porch area.

The main entrance doorway should have at least a 32-inch clearance. Automatic door openers allow for immediate access in and out of the home and should have four to six seconds delay. Manual doors could also be used but should be able to be opened with less than 5 pounds of force and close automatically. An electronic locking system would help Jason avoid handling keys. Along with a 5-foot-by-5-foot clear area, there should be a 24-inch space on the latch side of the door (where the handle is) as a landing to allow for wheelchair maneuvering when opening the door and accessing the doorway.

Hallways, Living Room and Dining Room

The hallways should be at least 42 to 60 inches wide. Doors should not open into the hallway, and there should be no low-profile or protruding objects, such as planters, shelves or light fixtures. In each room, furniture should be arranged to allow for a 5-foot-by-5-foot turning radius for Jason's wheelchair.

Floors of the hallway and the rooms should be at the same level



Jason has his own sink and countertop in the kitchen. The area under the sink is open so Jason can access the sink while in his wheelchair.

without thresholds. They also should have a nonslip surface, such as a nongloss wood finish, resilient tile or dense, tight, short uncut loop carpet glued to the floor.

All outlets and switches should be at accessible heights: 36 to 48 inches for switches; 24 to 30 inches for outlets; and 18 to 24 inches for telephone jacks. Installed timers, motion sensors or sound sensors that automatically turn lights on and off would eliminate the need for Jason to locate and manipulate light switches. He could use an environmental control unit to assist in activating and regulating lights, the TV, stereo, telephone, heating and air conditioning.

Since he likes to ambulate using environmental supports, sturdy furniture and handrails with adequate grasping surfaces should be placed along his routes throughout the house.

Interior Stairways

Although it is usually ideal for accessible homes to be one story for easier access, people with disabilities can live in two-story homes. For Jason, it was important to keep all the areas he needed to access on one level. However, the stairway could be fitted with a stair glide.

Kitchen

Although Jason was only 8 years old at the time the house was being built, the Fishers wanted the kitchen to be accessible and adaptable to provide greater independence as Jason grew older and began taking more responsibility in kitchen activities and chores.

At least a 5-foot-by-5-foot open space is recommended for wheelchair maneuvering. The lower cabinets under countertops and sinks should have retractable doors for wheelchair accessibility, with large knobs or D-ring handles. Although an expensive option, height-adjustable cabinets and countertops could help Jason access necessary food and dishes. The countertops should have a maximum depth of 24 inches and rounded edges and corners. Pull-out storage baskets or Lazy Susans would be easy for Jason to manipulate and access stored items, even from the back of the cabinet.

Since Jason and his parents will be using the kitchen, varying the height of countertops and two sinks, one for sitting and one for standing, would accommodate everyone. The plumbing under the sink should be located toward the back and insulated to avoid scalding. The faucets should have single levered handles or automatic controls. To avoid scalding, they should install anti-scald control devices or keep the water temperature down to 115 degrees or less.

A stove top with retractable doors underneath would allow Jason to safely access the burners. Controls would keep him from needing to reach over the burners. An angled mirror over the stovetop would enable him to see the contents of the pots from a seated position.

Bathroom

There are several ways to set up an accessible bathroom. A wheel-in shower room with a retractable bench or a permanently installed seat or a tub with a seat lift would allow for access using a walker or a wheelchair. The shower or the tub would need no-skid tub strips or a large rubberized mat on the floor. An automatic dispenser for shampoo, soap and toothpaste would increase independence.

The walls around the shower or tub should be reinforced to support grab bars, which should be placed throughout the bathroom. The faucets should have single-levered handles or automatic controls, preferably located on the side of the sink.

The toilet needs room for the wheelchair on either side and a grab bar on the wall behind it. The toilet seat height should allow



Jason's bathroom has several features that increase his independence, including an open area beneath the sink and a large shower with a bench and a nonslip floor. In addition, all the walls in the bathroom are reinforced so grab bars can be placed anywhere as needed.

for a level transfer from Jason's wheelchair to the seat (15 inches for pediatric wheelchairs and 17 to 19 inches for adult wheelchairs).

The cabinets and sink characteristics are the same as for the kitchen. The mirror above the sink would need to be slightly angled (about 1/2 inch) for Jason to see himself while in the chair. A medicine cabinet on the side wall by the sink is easier for Jason to access. An automatic hand dryer and a wall-mounted hair dryer would also be nice features.

And finally, the bathroom should have a telephone installed for emergencies, one located low enough to be reached if the person were on the floor.

Bedroom

Jason's bed height should be equal to his wheelchair seat height to allow for a level transfer. However, since he was only 8 at the time of the evaluation, the bed height should be adjustable to accommodate his growth. A grab bar pole from the ceiling to the floor would help him pull himself up or down, if needed. Built-in dressers, easy-glide drawers or baskets, and adjustable height rods in the closet would also facilitate his independence. Ideally, the closet should have sliding or pocket doors, or no doors at all. As with other rooms, the floors should be nonslip and light switches and outlets easily accessible. A telephone and intercom system by the bed would also be helpful.

BUILDING AN ACCESSIBLE HOME

Safety and Security

Because the Fishers plan to help Jason live as independently as possible, they likely will leave him alone on occasion as he grows older. As with all parents, they were concerned about emergencies occurring while they were gone.

Smoke detectors would be installed on all floors and wired to the fire department and a neighbor's home. Fire extinguishers would be located at accessible height with easy-to-use controls. The Fishers would work with Jason on memorizing and practicing escape plans and they would post a written plan with emergency telephone numbers at key locations. The telephone system should be preprogrammed with emergency phone numbers.

The smoke and gas detectors, door bells, security system and telephones should have audio and visual signals. An intercom could be activated by voice or remote control. The fuse and breaker box would be located in an accessible location on the main floor and at an accessible height. The entrance door could have small windows along the sides and a peephole at an accessible height.

Conclusion

After this evaluation, the Fishers chose an architect we recommend, knowing he is familiar with accessibility issues. He and the

The Fishers' Favorites

Some of Fishers' favorite accessible design features are:

- No-step front entrance and no-step entrance from the garage into a mud room and then the kitchen
- Smooth and continuous flooring throughout the home
- Single-levered handles mounted upside down so Jason's hands wouldn't slip off the handle: handles also came with anti-scald device
- Rocker light switches, which don't require finger manipulation, at 42 inches high and electrical outlets at 24 inches high
- Interior stairway from the first to second floor illuminated with motion-sensitive light sensors
- Wiring for environmental control units that accommodates X-10 and CEBA (digital cable) to allow for future trends in technology
- Recessed lighting and track lighting to avoid using lamps Jason could bump into
- Reinforced walls in bathroom for future grab bar location
- Installation of three drawers on left side of bathroom and kitchen sinks to accommodate Jason's hemiplegia
- Emergency exit from his bedroom with a ramp that's too steep for everyday use but adequate for emergencies; ramp can be modified if Jason wants to use this as his main entrance when he's older
- Location in a cul de sac to reduce traffic concerns
- One thing did not go as planned-the driveway is too steep for Jason to use in his wheelchair. That error will be corrected this spring when weather allows construction.



Because of concerns about Jason reaching the main entrance in case of an emergency, the Fishers had a ramp built outside Jason's bedroom. Although not practical for everyday use, it can be modified to become Jason's main entrance as he matures.

Fishers extensively researched each product that would be installed, from the single-levered faucets with temperature controls to the type of wiring needed for ECU installation.

The Fishers are now living in their new, accessible home. Since the move, Jason has gained substantial independence in caring for himself and moving through the house. The Fishers are pleased that Jason now has a home he can function well in and learn skills to eventually care for his own needs to achieve independence as he grows into adulthood.

Sometimes building an accessible home is less costly and more sensible than remodeling an existing home. Each person and family must carefully evaluate their own needs and financial resources, and look at the accessibility of not just the home but the surrounding community.

Shoshana Shamberg, O.T.R./L., and Aaron Shamberg, M.L.A., are president and vice president, respectively, of Abilities O.T. Services, Baltimore. The firm provides consultation/evaluation services nationally to rehab professionals, consumers, caregivers, private and public agencies and professionals in the design building industry on creating barrier-free environments. They also conduct educational training seminars about home accessibility. Contact them at 3309 W. Strathmore Ave., Baltimore, MD 21215; 410/358-7269; fax