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Michelle Dobmeier
University of North Dakota

Brett Johnson
University of North Dakota

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Pediatric Mobility Education Unit

by

Michelle Dobmeier, MOTS

Brett Johnson, MOTS

Gail Bass ORT/L, Advisor

Scholarly Project

Submitted to the faculty

of the

University of North Dakota Occupational Therapy Department

in partial fulfillment of the requirements

for the degree

Masters of Occupational Therapy

University of North Dakota

Grand Forks, ND

December 2003

CHAPTER I

INTRODUCTION

An assistive device for pediatric mobility can be described as any device or piece of technology that allows a child to move throughout his or her environment. Pediatric mobility through the use of assistive technology is a topic that is undergoing constant change and improvement due to the advancement of current technology and it is an area of education that requires constant updating in order to provide students with the most current information.

This topic was chosen due to a mutual interest in assistive technology as well as an interest in working with children with disabilities. We feel that independence in mobility at a young age will help children with disabilities develop the necessary skills needed to function in all of their environments as well as by actively interacting with their peers. Some of the additional benefits provided by independent mobility include the development of problem solving skills, learning opportunities, and increased motivation to participate in peer-oriented activities.

Through occupational therapy intervention, including the implementation of pediatric mobility devices, children with disabilities are able to increase their occupational performance. This increase in occupational performance can be seen in all aspects of the child's life, including socialization and participation behaviors, increased functional abilities, increased exploration of their environment, and ultimately in an increased sense of independence, which allows the child to build their self-esteem. To be an effective occupational therapist in the pediatric field, a practitioner must be aware of

the impact of pediatric mobility on performance and familiarize him or herself with the current mobility products available.

This education unit was designed to facilitate this learning process and provide students and therapists with the resources with which to obtain further information regarding pediatric mobility devices. This unit provides current information regarding the impact of mobility on development, the benefits of independent mobility, pediatric mobility devices currently available for use, and suggestions for receiving funding for assistive technology.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Research on the topic of pediatric mobility is very limited due to the privacy laws and limited access to records for the disabled population, as well as for children. According to general Institutional Review Board (IRB) rules, this population is considered vulnerable, and special precautions need to be taken into consideration in order to do research in this area. The information that was gathered for this literature review identifies the impact of mobility on development, benefits mobility provides to the child, the importance of a proper seating system, different devices available for the pediatric population, and what devices work best for specific individuals. The final section of literature deals with funding and training issues for pediatric mobility device use.

Impact of Mobility on Development

Some of the typical psychological milestones that occur in normal infants as they gain independent mobility include heightened sensitivity to objects or events beyond arm's reach, and increases in goal-oriented behavior. These milestones result in changes in parental expectations and communications, within which the infants are expected to begin assuming responsibility for their actions. According to Kermoian (1998), "significant changes are seen in the affective climate of the family following locomotor onset, with parents beginning to treat their infants as autonomous individuals who are

responsible for their actions” (p. 258). This change in parental expectation leads to an increased sense of independence for the child as well as the initiation of behavior patterns that the child will carry throughout life.

Kermoian (1998) wrote that when a child has a physical disability that limits independent locomotor function, they are more likely to have delayed psychological development. This is due to the lack of experience that they have in dealing with the sensory input and social constraints that are typically placed on children who can perform locomotion. It has been observed that when children with disabilities obtain a method of self-initiated mobility, they experience developmental changes that are comparable to those of infants who gain locomotor function independently. Along with delays in psychological development other areas of development, are affected as well because children with disabilities are unable to independently move throughout their environment. They are deprived of the learning experience typical of a child with normal development, including independent exploration, tactile stimulation, and gross motor movement.

By creating independent mobility for a child, it's possible to promote the development of perceptual-motor and social skills. Independence in mobility also plays a role in cognition, communication, and psychosocial development. Psychosocial development in terms of social understanding, spatial cognition, and emotions can all begin to develop with independence in locomotion, especially in infants. Locomotion is also said to promote the development of an infant's fear of heights, and finding lost items. All that is learned in this development process helps the child begin to learn social behaviors and physical play (Jones, McEwen, & Hansen, 2003).

Wright, Escobar, & Leslie (2002) pointed out that children who don't have an opportunity to explore are at a great disadvantage cognitively, scholastically, and neuropsychologically. These children are not able to experience many sensory motor and developmental activities like pushing or pulling toys, seeking and touching objects in their field of vision, or moving amongst and around objects.

Wright-Ott (2002), another pediatric mobility researcher, wrote:

During the first three years of life, children become mobile, learn to talk, play with toys, interact with peers and explore the environment. Infants transition through several stages of mobility during the first year from belly crawling to rolling, creeping, crawling and finally to an upright posture for ambulating. Young children are typically observed being in a state of perpetual motion, reaching out to their environment. In contrast, children who have physical limitations, such as those who are unable to stand and ambulate independently, are typically limited in their ability to reach out to interact with their environment. They are often restricted to static positions such as on the floor, in a stroller or positioned in therapeutic equipment such as a standing frame. They have few opportunities to act upon the environment; rather the environment has to be brought to them. (p. 82)

In conclusion, self-initiated mobility allows for the independence of choosing, problem solving, creating opportunities to learn a new skill, and interacting at the same level as peers. Children with disabilities should be given the same opportunities as other children to explore independently. A disabled child that has the assistance of a mobility device (either manual or powered) can create experiences on his or her own. The most important developmental aspect of pediatric mobility is the ability for the child to begin to build motivational skills and through his or her sense of independence, develop a sense of self-esteem.

Benefits

The primary benefit resulting from the use of pediatric mobility devices is an increase in occupational performance for the child with disabilities. A quantitative study done by Buning (2001) addressed the effects of powered mobility on occupational performance and feelings of competence, adaptability, and self-esteem. Through the use of the Occupational Performance History Interview (OPHI) and the Psychosocial Impact of Assistive Device Scale (PIADS) Buning found that there was significant improvement in occupational performance with the use of powered mobility as well as positive impacts on the client's self-reported feelings of competence, adaptability, and self-esteem when using the powered mobility compared to the manual mobility devices. Based on their results, the researchers were able to conclude that the use of powered mobility devices enhanced occupational performance, competence, adaptability, and self-esteem for persons with severe mobility impairments.

Another benefit of pediatric mobility is explained in a study completed by Deitz, Swinth & White (2002). The study described the effects of powered mobility on the participation behaviors of preschoolers. The researchers found that powered mobility devices increased the number of self-initiated movements as well as having an effect on the initiation of interactions with adults and peers within the school setting. The interactions observed included both positive and negative interactions, but the researchers emphasized that interaction with others, in general, was one of the goals of using powered mobility for independent movement. The researchers concluded that for some young children with severe motor impairments and developmental delay, use of a

powered mobility device might increase self-initiated movement occurrences during free play.

According to Richardson (2003), who completed a study on the school social environment for children with disabilities, adult involvement (with the adult being present almost constantly) hindered peer interaction. With the use of an independent mobility device, the child was able to be on his or her own more often, which facilitated increased peer interaction. One of the outcomes of Richardson's research was that children typically take on the role of onlooker, rather than participant. By providing the child with independent mobility, they would most likely participate in more activities with their peers, facilitating normal social development.

An additional benefit of self-initiated mobility is the increased sense of independence in relation to the child. Kermoian (1998) wrote:

The experiences associated with self-directed mobility appear to be particularly powerful because they both increase children's exposure to sensory stimulation and provide an environmental press to attend to and organize this new sensory input. As children adapt to these experiences, their behavior changes, and, in turn, they are perceived and responded to by others as more mature and autonomous.(p. 260)

Seating/Positioning Considerations

Children with disabilities typically have difficulty maintaining a stable, mechanically curved position due to abnormal movement patterns, low-tone or high-tone, and paralysis. If this is the case, it is critical to have the child in the proper seating position before choosing any type of mobility option. Typically, the most important

seating system is in the child's wheelchair because many of their other adaptive devices or equipment are utilized while in the wheelchair (Trefler, 1993).

Seating/positioning evaluation and intervention must include the entire treatment team, as well as any other individuals that are involved with the child on a regular basis, because these people understand and know the child the best and are responsible for the implementation of treatment. Occupational therapists and physical therapists can be an enormous asset to the team because they are skilled in determining the child's functional ability, can assess the child's areas of need, and provide the child with the best possible seating position. The results obtained from the assessment done by the therapists will also help in determining the technology needs of the child. (Trefler, 1993).

When selecting a seating system, it is important to take all aspects of the child into consideration such as psychosocial effects, economic considerations, growth of the child, and dynamic physical conditions. When looking at the physical considerations for children who need a seating device, many diagnoses have somewhat predictable physical conditions. For instance, a child that has Cerebral Palsy (CP) will have problems with muscle tone and coordination; these children can either be spastic or flaccid or have difficulty controlling purposeful movement. For children with CP, seating must be rigid with adequate trunk support that allows the child to move without being unbalanced. Children with spina bifida need to avoid skin breakdown, so they require a quality cushion or foam to help prevent pressure sores. They also may require a custom seating system to accommodate the abnormal curvature of the spine as well as for fragile skin at the site of the spinal lesion. An additional consideration for these children, rather than pulling themselves on the floor is alternate floor-level mobility (such as caster carts or

hand-propelled mobility). This helps prevent leg or heel injury when these children maneuver themselves across a hard surface. This population is especially prone to injury on the lower extremities due to the lack of sensation below the level of the spinal lesion. Children with a spinal cord injury are similar to those with spina bifida; they too need to be careful to avoid pressure sores. Both types of disabilities may leave a child incontinent, so seating materials must be soil-resistant or easily cleaned. (Trefler, 1993).

According to Trefler (1993), the main principles to consider for seating systems for children with disabilities include providing good support, limiting the excessive/abnormal movement patterns, providing comfort to the child, improving posture and increasing the ability to perform functional activities. Proper seating should also provide the child with a sense of security and stability that will enable the child to perform at a higher level for tasks such as eating, activating a communication device, and playing.

Devices

The importance of finding the right mobility device for a child cannot be stressed enough. There are many devices that are out there, but only certain devices are made for certain deficits and/or limitations. It is important that the caregivers understand the capabilities of the different devices that are available and what purpose the device is serving for the child.

Strollers

One type of device that is available for the pediatric population is an adaptive stroller. This device is recommended for children from the age of 3 months to 3 years.

The adaptive stroller is a lightweight-seating device that attaches to a mobile base. This device offers many different features such as trunk supports, headrest, hip guides, and the option of tilt and recline. The adaptive stroller resembles many typical strollers so it is easier for the parent or caregiver to accept the use of an adaptive stroller over a wheelchair. However, there are some limitations to an adaptive stroller. The majority of them do not accommodate for the growth of the child. More importantly, if the child is participating in socialization or school activities it doesn't allow them to be at the same level as their peers and the child is completely dependent on others for mobility. This device should not be recommended based specifically on a certain diagnosis, rather, it should be selected based on the current needs of the child and caregiver. However, strollers have been used for diagnoses such as premature infants with ventilator support, 6-month-old children with spina bifida, 1-year-old children with osteogenesis imperfecta, and 2-year-olds with cerebral palsy (Fisher & Ricardo, 2001).

Walkers and Gait Trainers

In addition to adaptive strollers, walkers and gait trainers are also designed for the pediatric population. According to T. Kimball (personal communication, October 29, 2003), the difference between walkers and gait trainers is that gait trainers have more prompts and supports for the child and are designed to provide the child with a functional gait. A walker also provides support for mobility, but does not provide as much support as a gait trainer. Most gait trainers have a variety of supports that are adjustable so they are easy to adjust to match the physical needs of the child, including chest prompts, forearm supports, handles for the child to grasp, leg abduction supports and supports to

prevent scissoring. Gait trainers also help to stimulate innate reflexes; when a child is in a forward-leaning position or tipped forward they reflexively take steps. This stimulation of righting reflexes is essential to begin the process of independent mobility. Many children with gross motor dysfunction still have these innate reflexes that will help them in the initial stages of learning to use these devices, and will hopefully promote them to eventually walk on their own. As described earlier, walkers typically provide less support compared to gait trainers. Push walkers are utilized for those with a moderate degree of sitting and standing balance. Support walkers provide the stabilization around the pelvis and trunk region for children who do not have good balance. By getting children started in these types of devices early enough, it will help in their overall development as well as assisting in their everyday transfers, such as stand pivot transfers.

Mobile Standers

A mobile stander may be an option for pediatric mobility when a child is unable to use his or her lower extremities. According to Ginney (2001), a mobile prone stander has numerous supports for the child that can be adjusted to provide proper support for the child. If the child needs to work with maintaining postural control, the supports can be lowered, thus the child needs to challenge him or herself to maintain the postural position. These standers have the larger wheels placed in the front for easier propulsion the wheels on the prone mobile stander are easier to propel than those of a wheelchair, however, the child needs to be able to weight shift to push the wheels. The goal is for the child to acquire some of the skills that may eventually lead to other functional activities, such as increased independence and transfers. This device is beneficial for those who are

unable to propel an ordinary wheelchair because the wheels are easier to propel and they have the added benefit of being independently mobile in a standing position, which allows the child to be more functional (Ginney, 2001).

Mobile prone standers give the child opportunities to explore their environment, not only does this exploration increase the child's awareness of his or her surroundings, the standing position also assists in strengthening breathing muscles, upper trunk musculature, and they also improved head control.. The movement created by the positioning of a mobile stander can help stimulate the functioning of the vestibular system and cerebellum, and improve visual perception skills (Ginney, 2001).

Mobile prone standers may also be mounted on power bases to provide standing mobility for children who are unable to propel a mobile prone stander on their own. One example of a powered stander, which combines the benefits of powered mobility with the physiological benefits of a standing position, is the GoBot. According to Wright-Ott (1999), the GoBot consists of an adjustable positioning frame, which is mounted on a battery-powered base. The positioning frame was designed to be adjustable enough to accommodate a number of diagnoses and conditions, with the child positioned in standing, semi-standing, or a seated position. A tray may also be attached to the GoBot to allow for proper positioning of various items (toys, food, and educational activities).

The GoBot provides the child the benefits of a standing frame with the independence of powered mobility. By being in a standing position, the child's arms are free to interact with the environment while the child is in a weight-bearing position. The standing weight-bearing position is beneficial to the child because it strengthens bone and muscle as well as promoting proper respiration, circulation, and digestion. The GoBot

enables the child to develop a variety of sensations independently including proprioception, spatial relations, visual perceptions, as well as vestibular input.

Wheelchairs

As mentioned previously, when describing mobility for individuals with disabilities, the most commonly used device is the wheelchair. There are currently a number of wheelchairs that are designed to fit the needs of the pediatric population. Wheelchairs can be either manual or powered chairs, with a variety of adaptations available to fit the needs of the child. According to Trefler, Hobson, Taylor, Monahan & Shaw (1993), if a person is able to operate a manual wheelchair efficiently across environments, then a manual wheelchair is most likely appropriate. However, if the person is unable to operate a manual device or if they expend a great amount of energy to operate the device, then powered mobility may be more appropriate.

With wheelchairs, there are a number of options available, ranging from the type of base, to the features and controls that are available to control the chair. One manual wheelchair option is front-wheel drive. This wheelchair can be used for children as young as 18 months. This wheelchair is designed with the casters in the rear and the larger wheels in the front to allow more efficient propulsion by a small child and greater surface area of the wheel to grasp. It also lowers the distance from seat to floor for the child to promote easier interaction with peers at their level, and more independence in transfers. One drawback of this device is that it makes it harder for the caregiver to maneuver the wheelchair. A child who may benefit from this device is similar to those previously stated for the stroller (Fisher & Ricardo, 2001).

Power wheelchairs are also used for children as young as 18 months of age. The primary reason to consider a power wheelchair is to promote independent mobility and/or the potential for mobility for children who are unable to use a manual wheelchair. A benefit of this device is that with advances in technology, a child can operate a power wheelchair in many different ways depending on the child's functional abilities. For example, a child can operate this type of device by using body parts, such as head, feet, tongue, mouth, hand, forearm, and eyebrow (Fisher & Ricardo, 2001).

According to Jones, McEwen, & Hansen (2003), there are four categories of children who are thought to benefit from powered mobility, including "children who will never walk, cannot efficiently move in a walker or manual wheelchair, those who have lost the ability to move as the result of a traumatic injury or progressive neuromuscular disorder, and those who require temporary assistance for mobility, most commonly due to surgical intervention" (p. 253). Children that fall into these categories would most likely benefit from the use of powered mobility because it may provide them with independence and help prevent functional limitations.

One important option when considering a wheel chair for the pediatric population is tilt-in-space capabilities. This option allows the child's body to be positioned in a fixed seat to back angle in space. It is primarily recommended to assist children with deficits in head/trunk control. It assists greatly in decreasing pressure sores and helps with respiratory function. Tilt-in-space benefits children with cerebral palsy, seizure disorders, spinal muscular atrophy, Rett syndrome, and acquired brain injury (Fisher & Ricardo, 2001).

Adapted Bicycles and Go-Karts

Adapted bicycles and go-karts can also be used with children who have physical disabilities. According to T. Kimball (personal communication, October 29, 2003), bicycles and go-karts are great options for children with disabilities who typically don't get to experience recreational opportunities similar to those of other children. There is currently a wide variety of bicycles on the market that are available for children with disabilities. One example of these is the Freedom Bike. The Freedom Bike has a variety of adaptations including adjustable handlebars, rear steering for the caretaker, and specialized pedals that the child's feet can be strapped into if they have low tone. Go-karts can also be adapted for children with disabilities. Innovative Products (based out of Grand Forks, ND) manufactures go-karts with custom seating systems and alternate input devices, such as switches, so any child is able to operate them. These mobility devices allow children with disabilities to experience a greater variety of leisure activities along with their peers.

Selection Process

When determining which type of mobility device to use with a child, all aspects of the device and the child must be taken into consideration along with the various environments that the device will be used in. One model that addresses all of these components is the HAAT model (Human Activity Assistive Technology). According to Cook and Hussey (2002), the HAAT model includes the components of the human using the device, the activity/activities to be performed with the device, the assistive technology device (mobility device) itself, and the context or environment in which the device will

be used. When all of these components are taken into consideration during the selection process, the device will be best matched to the child, allowing for the greatest functional abilities and use of the equipment.

One aspect that must be taken into consideration is the child's potential growth. Children tend to grow rapidly, so selecting a device that is adjustable will have benefits financially as well as provide comfort for the growing child. Other factors that need to be considered during the selection process are the child's functional skills, postural control, musculoskeletal alignment, and cognitive abilities. Finally, in determining the most appropriate mobility device for the child, consider the child's environment, social interaction, ability to transfer, level of motor control, and hand function (Fisher & Ricardo, 2001).

According to Wright, Escobar, & Leslie (2002), a practitioner should first identify the purpose for using the mobility device and determine what environment it will be used in. If the environment is indoors, one should consider a device that is highly maneuverable and allows the child to be upright. During the selection process, it's important to evaluate the use of the device in the child's natural environment. Most devices can be custom fit to the child to address specific needs. To assist in the selection process an occupational therapist or physical therapist will typically assess the child and suggest the most appropriate device. Once the device is obtained, the therapist will make the proper adjustments to the device, so that it fits the child accordingly. The average time that it would take an occupational or physical therapist to assess a child in variety of mobility devices would be approximately 5 hours. This would include an assessment, a home loan trial, a written report, and a fitting at delivery.

Wheelchair Selection

One of the most common devices selected for mobility is the wheelchair. There are many important things to remember when selecting a first wheelchair. Finding the most appropriate wheelchair for a young child can be difficult and complicated due to the numerous models and adaptations available to meet the variety of needs of children. Funding rules vary depending on where the child lives, and obtaining funding can be a barrier to obtaining the optimal wheelchair for a child. (Kinross, 2001).

One of the first steps involved in selecting a wheelchair is finding the right therapist who can make suggestions and guide the family on what's available and what would be the most beneficial to the child. After a therapist has had an initial meeting with the family, an assessment is done to determine the type of wheelchair that is needed to best serve the child. This assessment should include the input of all of the members of the child's treatment team and primary caregivers in order to get the best idea of what is truly the best option for the child (Kinross, 2001).

Typically, many children with disabilities will receive their first wheelchair between the ages of 2 and 4. The older models of wheelchairs were not very adaptable compared to models available today. There are now numerous options available so that the features of the chair can be matched to the needs of the specific child. The next important step is to make a list of the child's and family's needs. The family's needs are considered in the process due to issues of transportation, transfers in and out of the chair, and other family considerations. This list of needs should be used to help determine what type of chair should be chosen for the child and what features should be included with the chair to maximize function. (Kinross, 2001).

Wheelchair Frame Selection

Whether the child is able to provide self-propulsion or has to be pushed determines the weight, height, and type of wheels for the wheelchair. For younger children that are able to self-propel, a frame that allows the wheels to be placed close to the front would be most appropriate so the child can reach them. Also consider acquiring a lightweight, small frame chair with small wheels so that the child can be at the same level as his or her peers and can have better mobility. To determine the type of chair, it is important to consider and identify the transportation needs. Chairs can be rigid, folding or have tilt options. If the chair needs to be loaded into a vehicle, think in terms of a foldable frame; these chairs are also more flexible and allow for adjustments as the child grows. Rigid chairs tend to be lighter and ride better on harder surfaces, but are more difficult to transport. Tilt chairs are utilized for children who are unable to sit upright. If a wheelchair is needed for a child who has good trunk control and wants to play sports, the chair needs to maneuver easily and have a tight turning radius with the ability to tip backward without going over. For those with poor trunk control, chairs that are more stable with a wider base are recommended (Kinross, 2001).

Many chairs have adjustable features so that they can be utilized as a child grows. For instance, the wheel-axle plate allows adjustment of the seat-to-floor height. The cross braces can be adjusted to allow for a few inches in seat width. Some manufacturers have growth kits available, but funding becomes an issue because labor costs are involved when making proper adjustments to the wheelchair (Kinross, 2001).

Depending on the child, the seat height may vary. The seat can be low to create independence for the child in getting in and out, however; it may need to be higher to

assist the caregiver in lifting the child in and out. Selection considerations are not always made specifically for the child. In certain instances, the caregiver's needs must be balanced with the needs of the low functioning child (Kinross, 2001).

Wheelchair Tire Selection

It's also important to look at the child's environment in which the chair is to be used. Where the chair will be used will help determine what size of tires to get. The best tire that works across all environments is the air-filled tire because of its smooth ride and shock absorption. If a chair is to be used primarily indoors, solid tires that don't go flat are used. For outdoor use, large thick-treaded tires are recommended to ensure a comfortable ride (Kinross, 2001).

General Wheelchair Selection Considerations

It is important that all aspects of the child, the child's environment, and the child's caregivers are taken into consideration when selecting a wheelchair. All of the options available should be researched, as well as the consideration of the child's needs and therapists' opinions. Finally, before the final selection is made, a chair that can be used once on a trial basis should be tested by the child to make sure it is going to meet his or her needs. No compromises in the selection process should be made, because it's not just a wheelchair, it means independence for the children.

Summary

According to Dietz (1998) there are many aspects that must be taken into consideration when matching a child with a pediatric mobility device. These include the attitude of the child who will be using the device, the attitudes and concerns of the parents and caregivers, the perceptual and cognitive skills of the child, and the extent to which the device facilitates inclusion in the child's various settings.

Dietz (1998) further explains that the attitudes of the child include the child's motivation in using the device, as well as their ability to control the mobility device independently. Studies have suggested that children as young as 6 months may be able to independently control a mobility device through the use of switches. The attitudes and concerns of the parents or caregivers must also be taken into consideration. This can be a difficult process. When the child with disabilities is younger, the parents are typically still going through the grieving process, and they may view power mobility as another sign that their child will not walk on their own. Education of parents regarding the developmental process is critical at this time frame to explain to them that independent movement in any form facilitates further growth and development, which may increase the child's capabilities. They should view independent mobility as a step forward in development rather than a set back. Parental acceptance of the device is critical to ensure that the device is not abandoned. The perceptual and cognitive skills of the child must also be taken into consideration. This is especially evident during the training process, as will be discussed later in this literature review. Inclusion is another important consideration when choosing a mobility device. The device must be evaluated for

functionality in home, school, and community environments in order to promote social interaction, ensure its use, and increase its cost effectiveness.

In summary, during the assessment process, the developmental needs of the child must be taken into consideration. The device should be easily adjusted to accommodate for the growth of the child, the child should be properly positioned in order to perform functional activities, the device should be easily transported, and it should take the needs of the caregiver into consideration as well. When all areas of life are considered, the device will be the most beneficial to the child, it will be conducive to his or her environment, and will have a decreased chance of being abandoned.

Training

When training a child in the proper use of pediatric mobility equipment, it is essential to modify the training and match it to the cognitive abilities of the child. This is especially important when training children to use powered mobility devices. According to Dietz (1998), “The emergence of wariness of heights, as assessed on the visual cliff, is not innate, but follows the acquisition of self-produced mobility”(p. 272). This lack of innate fear of heights could potentially lead to disastrous consequences for children who are placed in powered mobility without proper training. Dietz continues to elaborate on research findings that indicate that object permanence is closely linked with self-produced locomotion. It is important to note that self-initiated movement leads to the development of these visual-perceptual skills, therefore the child will most likely not have developed them prior to the introduction of powered mobility. Close supervision

and training upon introduction of the device is required to ensure the safety of the child and others.

Before allowing children who are typically developing to creep or crawl, we do not require specific prerequisite skills. Instead, we supervise their movement and “childproof” their environment. This same approach deserves consideration for children with motor impairments, except that, at the appropriate developmental stage, we need to provide devices to enable mobility and then allow supervised self-initiated movement exploration. (p. 272)

The cognitive abilities of the child being trained are especially important when the child has significant cognitive impairments. Individuals with profound cognitive disabilities function at a low developmental level and have difficulties in sensing, integrating, interpreting, and responding to their surroundings. The use of expensive, high-technology devices such as powered wheelchairs are not recommended for individuals who lack the skills to control them due to safety concerns regarding themselves and others (Nilsson & Nyberg, 2003). This highlights the need for proper cognitive assessment prior to placing the child in a powered mobility device.

Due to the significant risks, there have been few studies done regarding training individuals with profound cognitive disabilities to use powered mobility devices. One such study was done with two preschool children, one girl and one boy, with profound cognitive disabilities as well as additional motor and visual impairments. The purpose of this study was to look at the individual behavior and development that occurred over a period of training sessions with a powered wheelchair. The two children had similar deficits; both were nonverbal, had limited body movement, did not reach, grasp, or manipulate objects, and demonstrated limited visual tracking skills. However, after beginning the session by stimulating the movement of the wheelchair by hand-over-hand contact on the joystick small changes in the children began to take place. The changes

that were made were not directly related to the children's ability to operate the wheelchair but in their perception of their surroundings. The children were at first anxious regarding their new surroundings, but the anxiety eventually reduced and they became excited after experiencing the motion of the chair. Both children seemed calm, relaxed, and attentive by consistently keeping their eyes open, even if they arrived to the training session sleepy. Only on occasional attempts were the children able to initiate driving, so it was not considered a learned purposeful behavior (Nilsson & Nyberg, 2003).

This study did prove that training through the use of powered mobility can provide many benefits to children with disabilities. These benefits include: increased alertness, attentiveness and receptiveness to external stimulation, interaction with the environment, and motor stimulation resulting in a very limited use of the hands and arms. The children were also able to develop an understanding of the relationship between the joystick and the motion of the chair. Many skeptics think that the use of a highly expensive piece of equipment such as a powered wheelchair for an individual that may not ever drive is an unneeded expense to society. This study showed that unintentional activated mobility stimulates an individual's position in space and sensory perception, resulting in an increase in the individual's alertness. This new concept of driving to learn, instead of learning to drive will help promote an individual's understanding of using their hands or arms to influence their surroundings. This in turn may help facilitate the use of other types of technologies such as single switches to help them better interact within their environment, creating more opportunities to learn and experience new things (Nilsson & Nyberg, 2003).

On the other hand, when looking at independent mobility training for the intention of creating purposeful actions, many issues need to be taken into consideration. First, by understanding the importance of independent mobility for a child's development it's essential that health-care providers be prepared to instruct the child on how to use a mobility device in many different settings. By doing this the health-care provider can help guide the child's motor learning process. Developing a child's motor learning will help produce skilled and purposeful actions because of the child's practice and experience. When teaching these skills, it is important that they are taught across the child's entire environment, not just in the clinical session because random use and practice build on the initial skill learned. Powered mobility is recommended as part of early intervention with children with severe motor impairments to promote independence and the development of numerous skills (Jones, McEwen, & Hanson, 2003).

Funding

Funding for pediatric mobility can be a daunting process. In order for a pediatric mobility device to be funded by a third-party provider, the device must be considered medically necessary, and essential to the growth and development of the child. There are numerous mobility devices available on the market, many of which may be beneficial to the child, but due to financial considerations, the choices may be limited to specific devices, which are reimbursable by third-party payers. Families with children who have disabilities typically are under financial constraints due to excessive medical costs.

The following is an overview of how to get started in the reimbursement process for those who are working with the disabled individuals. According to Pride Mobility these are the steps to take in receiving funding for assistive technology:

- Recognize and identify the problem
- Document what needs exist
- Identify the equipment and/or services needed
- Determine if there is alternate way to get the equipment
- Determine if the particular equipment desired is really cost-effective
- Determine potential funding resources
- Follow the application guidelines/requirements exactly
- Have a positive attitude and follow up

“Policies and procedures for providing assistive technology funding are still being refined. The policies and procedures that do exist can be confusing, differ from agency to agency, and are complex. Getting funding is not the easiest thing to do, but it is possible.

Become familiar with the ways agencies work a stick with your quest for funding. Using an advocate might make your journey easier. Success means a great deal of effort on your part, but the rewards are worth it” (Pride Mobility, 2003).

CHAPTER III

METHODOLOGY

Due to mutual interest in the topic of pediatrics and discussion with our advisor, it was determined that mobility in the realm of pediatrics was an area that required further research in order to define best practices in this area. It was decided that this scholarly project would consist of an education unit to inform occupational therapy students about pediatric mobility. This teaching unit will become a part of the seating and positioning unit in OT 429: Occupational Therapy with school-aged children and adolescents.

To gain further understanding in this area, the student researchers each participated in practicum experiences with pediatric mobility providers. These practicum experiences were completed at HOPE, Inc. and Innovative Products, Inc., which are both located in Grand Forks, ND. HOPE Incorporated is a non-profit organization which provides children with disabilities with recreational opportunities and mobility equipment. Innovative Products is a company the manufacturers mobility products and works in conjunction with HOPE Inc. to display their products at mobility expos. Through personal communications with advisors at these fieldwork sites, the student researchers learned about current devices and adaptations available for pediatric mobility, and obtained information regarding funding sources and support services available to children with disabilities. Both researchers were able to gain hands-on experience with mobility devices, allowing them to have a practical understanding of how the devices are manufactured and fitted to accommodate the needs of the children that will use the devices.

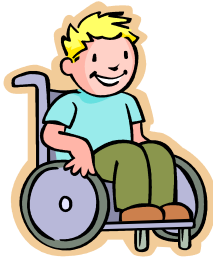
Further information was gathered through an extensive literature review by compiling journal articles from a variety of sources. These sources included Infotrac databases, the American Journal of Occupational Therapy, professionally developed internet sources, course textbooks, as well as research information provided by HOPE, Inc. regarding pediatric mobility.

A power point teaching presentation was developed based on current practices found in the literature and information compiled during out practicum experiences. As previously noted, this education unit will be incorporated into the pediatric seating a positioning unit for first year students in the UND Occupational Therapy Program. In addition to the power point teaching materials, the unit will include a resource guide for pediatric mobility.

CHAPTER IV

PRODUCT

Pediatric Mobility Educational Unit



Pediatric Mobility Resource Guide

Device Manufacturers/Suppliers

www.standingdani.com

www.gbkids.com

www.freedomconcepts.com

www.mulhollandinc.com

www.pridemobility.com

Shoreline Health - <http://www.shorelinehealthco.com/mobility.htm>

Edmond Wheelchairs - <http://www.edmond-wheelchair.com/wheelchairs.htm>

Peak Wheelchairs - <http://www.peakwheelchairs.com/HTML/rehab-pediatric.htm>

Spine Life - <http://www.spinlife.com/zine/newarticle.cfm?artid=197&typeid=126>

Mobility Providers/Service Agencies/Support Groups

www.hopeinonline.org

www.family-friendly-fun.com

www.disabilityisnatural.com

www.parenttoparent.org

www.sportsforkids.org

www.firsthandfoundation.org

www.ndad.org

Maximizing Mobility - <http://www.rehabpub.com/ltrehab/12012001/5.asp>

Mobility Solutions - <http://www.mobility-solutions.com/>

Seating & Mobility - <http://www.seatingandmobility.ca/>

AOTA - <http://www.aota.org/>

Funding Resources

State Technology Assistance Projects—Each state and territory in the U.S. has a Technology Assistance project that has up-to-date information on assistive technology resources for that state. Some projects have compiled lists of funding resources available in their states.

Alabama

Statewide Technology Access and Response (STAR) System for Alabamians with Disabilities

Alabama Dept. of Rehabilitation Services

2125 East South Blvd., P.O. Box 20752

Montgomery, AL 36120-0752

V: 800/782-7656 (in state only); 334/613-3480.

TTY: 334/613-3519.

Fax: 334/613-3485.

E-mail: tbridges@rehab.state.al.us/star.

Web: <http://www.rehab.state.al.us/star>.

Alaska

Alaska Assistive Technology Project
Department of Education
Division of Vocational Rehabilitation Assistive Technologies of Alaska
1016 West 6th St., Suite 205
Anchorage, AK 99501
V: 800/478-4378 (in state only); 907/269-3570.
TTY: 800/898-0138 (in state only); 907/563-0153.
Fax: 907/269-3632.
E-mail: james_beck@labor.state.ak.us.
Web: <http://www.labor.state.ak.us/at/index.htm>.

American Samoa

American Samoa Assistive Technology Service (ASATS) Project
Division of Vocational Rehabilitation, Department of Human Resources
Pago Pago, American Samoa 96799
V: 011/684/699-1529 (V).
TTY: 011/684/233-7874.
Fax: 011/684/699-1376.
E-mail: edperei@yahoo.com.

Arizona

Arizona Technology Access Program (AzTAP)
Northern Arizona University
4105 N. 20th Street, Suite 260
Phoenix, AZ 85016
V: 800/477-9921 (in state only); 602/728-9534.
TTY: 602/728-9536.
Fax: 602/728-9353.
E-mail: jill.oberstein@nau.edu.
URL: <http://www.nau.edu/ihd/aztap.html>.

Arkansas

Arkansas Increasing Capabilities Access Network (ICAN)
Department of Education/Vocational Education Division
Arkansas Rehabilitation Services
2201 Brookwood Drive, Suite 117
Little Rock, AR 72202
V/TTY: 800/828-2799 (in state only); 501/666-8868.
Fax: 501/666-5319.
E-mail: aehurst@ars.state.ar.us.
Web: <http://www.arkansas-ican.org>.

California

California Assistive Technology System (CATS)
Department of Rehabilitation

P.O. Box 944222
Sacramento, CA 94244-2220
Voice: 916/263-8687.
TTY: 916/263-8685.
Fax: 916/263-8683.
E-mail: info@atnet.org.
Web: <http://www.atnet.org>.

Colorado

Colorado Assistive Technology Project
The Pavilion, A036/B140
1919 Ogden Street
Denver, CO 80218
V: 800/255-3477 (in state only); 303/864-5100.
TTY: 303/864-5110.
Fax: 303/864-5119.
E-mail: cathy.bodine@uchsc.edu.
Web: <http://www.uchsc.edu/atp/>.

Connecticut

Connecticut Assistive Technology Program
Department of Social Services
Bureau of Rehabilitation Services
25 Sigourney St., 11th Floor
Hartford, CT 06106
V: 800/537-2549 (in state only); 860/424-4881.
TTY: 860/424-4839.
Fax: 860/424-4850.
E-mail: Techact@UConnvm.uconn.edu.
URL: <http://www.techact.uconn.edu>.

Delaware

Delaware Assistive Technology Initiative (DATI)
Center for Applied Science and Engineering
University of Delaware/A.I. duPont Hospital for Children
1600 Rockland Road, Room 154
P.O. Box 269
Wilmington, DE 19899-0269
V/TTY: 800/870-DATI (in state only)
V: 302/651-6790.
TTY: 302/651-6794.
Fax: 302/651-6793.
E-mail: dati@asel.udel.edu.
URL: <http://www.asel.udel.edu/dati/>.

District of Columbia

University Legal Services Assistive Technology Program for the District of Columbia

300 I St., NE Suite 202

Washington, DC 20002

V: 202/547-0198.

TTY: 202/546-2657.

Fax: 202/645-2662.

E-mail: atpdc@uls-dc.com.

Web: <http://www.atpdc.org>.

Florida

Florida Alliance for Assistive Services and Technology (FAAST)

1020 E. Lafayette St., Suite 110

Tallahassee, FL 32301-4546

V/TDD: 800/322-7881 (in state, information and referral only); 850/487-3278.

Fax: 850/487-2805.

E-mail: faast@faast.org.

Web: <http://www.faast.org>.

Georgia

Tools for Life

Department of Labor/Tools for Life

Vocational Rehabilitation Program

1700 Century Circle B-4

Atlanta, Georgia 30345

Voice: 800/497-8665 (in state only); 404/657-3084;

TTY: 404/657-3085.

Fax: 404/657-3086.

E-mail: 102476.1737@compuserve.com.

URL: <http://www.gatfl.org/>.

Guam

Guam System for Assistive Technology (GSAT)

University of Guam

University Affiliated Program on Developmental Disabilities

UOG Station

303 University Drive, House # 19 Dean's Circle

Mangilao, GU 96923

Voice: 011/671/735-2493.

TTY: 011/671/734-8378.

Fax: 011/671/734-5709.

E-mail: gsat@ite.net.

Web: <http://www.uog.edu/uap/gsat.html>.

Hawaii

Assistive Technology Resource Centers of Hawaii (ATRC)
414 Kuwili St., Suite 104
Honolulu, HI 96817
V/TTY: 800/645-3007 (in state only); 808/532-7110.
Fax: 808/532-7120.
E-mail: atrc@atrc.org.
Web: <http://www.atrc.org>.

Idaho

Idaho Assistive Technology Project
Idaho Center on Developmental Disabilities
University of Idaho
Professional Building
129 West Third Street
Moscow, ID 83844-4401
V/TT: 800/432-8324 (in state only); 208/885-3559.
Fax: 208/885-3628.
E-mail: seile861@uidaho.edu.
Web: <http://www.ets.uidaho.edu/idatech/>.

Illinois

Illinois Assistive Technology Project
1 W. Old State Capital Plaza, Suite 100
Springfield, IL 62701
V/TTY: 800/852-5110 (in state only).
V: 217/522-7985.
TTY: 217/522-9966.
Fax: 217/522-8067.
E-mail: iatp@fgi.net.
Web: <http://www.iltech.org>.

Indiana

ATTAIN: Assistive Technology Through Action in INdiana
2346 South Lynhurst Drive
Airport Office Centre Suite 507
Indianapolis, IN 46241
V: 800/528-8246 (in state only); 317/486-8808.
Fax and TTY: 317/486-8809.
E-mail: attain@attaininc.org.
Web: <http://www.attaininc.org>.

Iowa

Iowa Program for Assistive Technology
University of Iowa, University Hospital School
100 Hawkins Drive, Room S295

Iowa City, IA 52242-1011
V: 800/331-3027; 319/356-0550.
TTY: 877/686-0032.
Fax: 319/356-8284.
E-mail: infotech@uiowa.edu.
Web: <http://www.uiowa.edu/infotech/>.

Kansas

Assistive Technology for Kansans
University of Kansas
University Affiliated Program at Parsons Assistive Technology Center
2601 Gabriel, P.O. Box 738
Parsons, KS 67357
V/TTY: 800/526-3648 (in state only); 316/421-8367.
Fax: 316/421-0954.
E-mail: ssack@ku.edu.
Web: <http://www.atk.lsi.ukans.edu>.

Kentucky

Kentucky Assistive Technology Service (KATS) Network
Kentucky Department for the Blind
KATS Network Coordinating Center
8412 Westport Road
Louisville, KY 40242
V/TTY: 800/327-5287 (in state only); 502/327-0022.
Fax: 502/327-9974.
E-mail: katsnet@iglou.com.
Web: <http://www.katsnet.org>.

Louisiana

Louisiana Assistive Technology Access Network (LATAN)
P.O. Box 14115
3042 Old Forge Road, Suite B
Baton Rouge, LA 70898-4115
V/TTY: 800/270-6185 (in state only); 225/925-9500.
Fax: 225/925-9560.
E-mail: jnesbit@latan.org.
Web: <http://www.latan.org>.

Maine

Maine Consumer Information and Technology Training Exchange (Maine CITE)
Maine CITE Coordinating Center
University of Maine System Network
46 University Drive
Augusta, ME 04330
V: 207/621-3195.

TTY: 207/621-3482.
Fax: 207/621-3193.
E-mail: iweb@doe.k12.me.us.
Web: <http://www.maine.cite.org>.

Maryland

Maryland Technology Assistance Program (MTAP)
2301 Argonne Drive
Baltimore, MD 21218-1696
V/TTY: 800/832-4827 (in state only); 410/554-9230.
Fax: 410/554-9237.
E-mail: info@mdtap.org.
Web: <http://www.mdtap.org>.

Massachusetts

MATP Center
Children's Hospital
1295 Boylston Street, Suite 310
Boston, MA 02215
V/TTY: 800/848-8867 (in state only).
V: 617/355-7153.
TTY: 617/355-7301.
Fax: 617/355-6345.
E-mail: matp@matp.org.
Web: <http://www.matp.org>.

Michigan

Michigan Assistive Technology Project
740 West Lake Lansing Road, Suite 400
Lansing, MI 48823
V/TTY: 800/760-4600; 517/333-2477.
Fax: 517/333-2677.
E-mail: kdwyeth@match.org.
Web: <http://www.copower.org>.

Minnesota

System of Technology to Achieve Results (STAR)
Governor's Advisory Council on Technology for People with
Disabilities
300 Centennial Building
658 Cedar Street, Room 360
St. Paul, MN 55155
V: 800/657-3862 (in state only); 612/296-2771.
TTY: 800/657-3895 (in state only); 612/296-8478.
Fax: 612/282-6671.

E-mail: star.program@state.mn.us.
URL: <http://www.admin.state.mn.us/assistivetechology/>.

Mississippi

Project START - Success Through Assistive/Rehabilitative
Technology
Department of Rehabilitation Services
P.O. Box 1698
Jackson, MS 39215
V/TTY: 800/852-8328 (in state only); 601/987-4872.
Fax: 601/364-2349.
E-mail: spower@mdrs.state.ms.us.

Missouri

Missouri Assistive Technology Project
Missouri Department of Labor and Industrial Relations
4731 South Cochise, Suite 114
Independence, MO 64055-6975
V: 800/647-8557 (in state only); 816/373-5193.
TTY: 800/647-8558 (in state only).
Fax: 816/373-9314.
E-mail: matpmo@qni.com.
Web: <http://www.dolir.state.mo.us/matp/>.

Montana

MonTECH
Rural Institute on Disabilities
The University of Montana
634 Eddy Avenue
Missoula, MT 59812
V/TTY: 800/732-0323 (in state only); 406/243-5676.
Fax: 406/243-4730.
E-mail: montech@selway.umt.edu.
Web: <http://ruralinstitute.umt.edu/HDC/montech.htm>.

Nebraska

Nebraska Assistive Technology Partnership
5143 South 48th Street, Suite C
Lincoln, NE 68516-2204
V/TTY: 888/806-6287 (in state only); 402/471-0734.
Fax: 402/471-6052.
E-mail: mschultz@atp.state.ne.us.
Web: <http://www.nde.state.ne.us/ATP/TECHome.html>.

Nevada

Nevada Assistive Technology Collaborative

Rehabilitation Division
Community-Based Services
711 South Stewart Street
Carson City, NV 89710
V: 775/687-4452.
TTY: 775/687-3388.
Fax: 775/687-3292.
E-mail: pgowins@govmail.state.ne.us.
Web: http://detr.state.nv.us/rehab/reh_pgbs.htm#State Assistive Technology Act Program.

New Hampshire

New Hampshire Assistive Technology Partnership
Institute on Disability/UAP
10 Ferry Street, Unit 14. Suite 317/318
Concord, NH 03301
V/TT: 800/238-2048 (in state only); 603/224-0630.
Fax: 603/226-0389 (Fax).
E-mail: sonke.dornblut@unh.edu.
Web: <http://iod.unh.edu/projects/assist.htm#nhatpp>.

New Jersey

New Jersey Technology Assistive Resource Program (TARP)
210 South Broad Street, Third Floor
Trenton, NJ 08608
V: 800/342-5832 (in state only); 609/777-0945.
TTY: 609/633-7106.
Fax: 609/777-0187.
E-mail: advoca@njpanda.org.
Web: <http://www.njpanda.org/tarp/index.html>.

New Mexico

New Mexico Technology-Related Assistance Program (NMTAP)
435 Saint Michaels Drive, Building D
Santa Fe, NM 87505
V: 800/866-2253; 505/827-3532.
TTY: 800/659-4915 (in state only); 505/827-3587.
Fax: 505/954-8562.
E-mail: aklaus@state.nm.us.
Web: <http://www.nmtap.com>.

New York

New York State Office of Advocate for Persons with Disabilities
TRAID Project
One Empire State Plaza, Suite 1001
Albany, NY 12223-1150

V/TTY: 800/522-4369 (in state only).
V: 518/474-2825.
TTY: 518/473-4231.
Fax: 518/473-6005.
E-mail: traid@nysnet.net.
Web: http://www.advoc4disabled.state.ny.us/TRAID_Project/technlog.htm.

North Carolina

North Carolina Assistive Technology Project
North Carolina Department of Human Resources
Division of Vocational Rehabilitation Services
1110 Navaho Drive, Suite 101
Raleigh, NC 27609-7322
V/TT: 919/850-2787.
Fax: 919/850-2792.
E-mail: rickic@mindspring.com.
Web: <http://www.mindspring.com/~ncatp>.

North Dakota

North Dakota Interagency Program for Assistive Technology (IPAT)
P.O. Box 743
Cavalier, ND 58220
V/TT: 800/265-4728; 701/265-4807.
Fax: 701/265-3150.
E-mail: jlee@polarcomm.com.
Web: <http://www.ndipat.org/>.

Northern Mariana Islands

CNMI System of Technology-Related Assistance for Individuals with Disabilities (STRAID)
CNMI Governor's Developmental Disabilities Council
Commonwealth of Northern Mariana Islands
P.O. Box 502565
Saipan, MP 96950-2565
V/TTY: 011/670/664-7000.
Fax: 011/670-664-7030.
E-mail: clamkin@cnmiddcouncil.org.
Web: <http://www.cnmiddcouncil.org/atstarid/atflash.htm>.

Ohio

Ohio Project on Technology-Related Assistance for Individuals
J.L. Camera Center
2050 Kenny Road, 9th Floor
Columbus, OH 43221
V/TTY: 800/784-3425 (in state only).
V: 614/292-2426.

TTY: 614/292-3162.
Fax: 614/292-5866.
E-mail: atohio@osc.edu.
Web: <http://www.atohio.org>.

Oklahoma

Oklahoma ABLE Tech
Oklahoma State University
1514 West Hall of Fame
Stillwater, OK 74078
V/TTY: 800/257-1705 (in state only); 405/744-9748.
Fax: 405/744-7670.
E-mail: mljwell@okstate.edu.
Web: <http://okabletech.okstate.edu/>.

Oregon

Technology Access for Life Needs
Oregon Disabilities Commission
3070 Lancaster Drive NE
Salem, OR 97305
V/TTY: 800/677-7512 (in state only); 503/361-1201.
Fax: 503/370-4530.
E-mail: ati@orednet.org.
Web: <http://www.taln.org/>.

Pennsylvania

Pennsylvania's Initiative on Assistive Technology (PIAT)
Temple University
Institute on Disabilities/UAP
Ritter Annex, Room 433
Philadelphia, PA 19122
V: 800/204-7428 (in state only).
TTY: 800/750-7428 (in state only).
Fax: 215/204-9371.
E-mail: piat@astro.temple.edu.
Web: http://www.temple.edu/inst_disabilities/piat/.

Puerto Rico

Puerto Rico Assistive Technology Project
Universidad de Puerto Rico
Recinto de Ciencias Médicas
Colegio de Profesiones Relacionados con la Salud
PO Box 365067
San Juan, PR 00936-5067
V/TTY: 800/496-6035 (in U.S.); 800/981-6033 (in Puerto Rico).
TTY: 787/754-8034.

Fax: 787/759-3645.
E-mail: pratp@rcmad.upr.clu.edu.
Web: <http://www.pratp.org>.

Rhode Island

Rhode Island Assistive Technology Access Partnership (ATAP)
Rhode Island Department of Human Services
Office of Rehabilitation Services
40 Fountain Street
Providence, RI 02903-1898
V: 800/916-8324 (in state only); 401/421-7005;
401/272-7990 (Cambodian); 401/272-8090 (Spanish).
TTY: 401/421-7016.
Fax: 401/421-9259.
E-mail: reginac@ors.state.ri.us.
Web: <http://www.atap.state.ri.us/>.

South Carolina

South Carolina Assistive Technology Program (SCATP)
USC School of Medicine
Center for Disability Resources
Columbia, SC 29208
V/TTY: 800/922-1107 (in state only); 803/935-5263.
Fax: 803/935-5342.
E-mail: jjendron@usit.net.
Web: <http://www.sc.edu/scatp/>.

South Dakota

DakotaLink
1925 Plaza Boulevard
Rapid City, SD 57702
V/TTY: 800/645-0673 (in state only); 605/394-1876.
E-mail: atinfo@tie.net.
Web: <http://dakotalink.tie.net/>.

Tennessee

Tennessee Technology Access Project
Cordell Hull Bldg, 5th Floor
425 5th Avenue North
Nashville, Tennessee 37243
V: 800/732-5059 (in state only); 615/531-3122.
TTY: 615/741-4566.
Fax: 615-532-4685.
E-mail: ttap@mail.state.tn.us.
Web: <http://www.state.tn.us/mental/ttap.htm>.

Texas

Texas Assistive Technology Partnership Project
University of Texas at Austin
Texas University Affiliated Program
SZB 252-D5100
Austin, TX 78712-1290
V/TTY: 800/828-7839 (in state only).
V: 512/471-7621.
TDD: 512/471-1844.
Fax: 512/471-7549.
E-mail: techaccess@teachnet.edb.utexas.edu.
Web: <http://tatp.edb.utexas.edu/>.

U.S. Virgin Islands

U.S. Virgin Islands Technology-Related Assistance for Individuals with Disabilities (TRAID)
University of the Virgin Islands/University Affiliated Program
#2 John Brewer Bay
St. Thomas, VI 00801-0990
V:340/693-1323.
Fax: 340/693-1325.
E-mail: yhabtes@uvi.edu.
Web: <http://www.uvi.edu/pub-relations/viuapindx.htm>.

Utah

Utah Assistive Technology Program (UATP)
Utah State University
Center for Persons with Disabilities
6588 Old Main Hill
Logan, UT 84322-6588
V/TTY: 435/797-7089.
V: 435/797-3824.
Fax: 435/797-2355.
E-mail: judith@cpd.usu.edu.
Web: <http://www.uatpat.org>.

Vermont

Vermont Assistive Technology Project
103 South Main Street
Weeks Building, First Floor
Waterbury, VT 05671-2305
V/TTY: 800/639-1522 (in state only); 802/241-2620.
Fax: 802/241-2174.
E-mail: mikell@dad.state.vt.us.
Web: <http://www.dad.state.vt.us/atp/>.

Virginia

Virginia Assistive Technology System (VATS)
Department of Rehabilitative Services
8004 Franklin Farms Drive
P.O. Box K-300
Richmond, VA 23288-0300
V/TTY: 800/435-8490 (in state only); 804/662-9990.
Fax: 804/662-9478.
E-mail: knorrkh@drs.state.va.us.
Web: <http://www.vats.org>.

Washington

Washington Assistive Technology Alliance (WATA)
University of Washington
Center for Technology and Disability Studies
CHDD South Building, Room 104
P.O. Box 357920
Seattle, WA 98195-7920
V/TTY: 800/841-8345 (in state only).
V: 206/685-4181.
TTY: 206/616-1396.
Fax: 206/543-4779.
E-mail: uwctds@u.washington.edu.
Web: <http://wata.org>.

West Virginia

West Virginia Assistive Technology System (WVATS)
WVUCED
Robert C. Byrd Health Sciences Center
955 Hartman Run Road
Morgantown, WV 26505
V/TTY: 800/841-8436 (in state only); 304/293-4692.
Fax: 304/293-7294.
E-mail: jstewart@wvu.edu.
Web: <http://www.ced.wvu.edu/wvats/>.

Wisconsin

WisTech
Wisconsin Assistive Technology Program
Division of Supportive Living
P.O. Box 7851
1 W. Wilson Street, Room 450
Madison, WI 53707
V: 608/266-1794.
TTY: 608/267-9880.
Fax: 608/267-3203.

E-mail: abbey@dhfs.state.wi.us.
Web: <http://www.wistech.org>.

Wyoming

Wyoming's New Option in Technology (WYNOT)
University of Wyoming
1465 North 4th Street, Suite 111
Laramie, WY 82072
V/TTY: 800/861-4312 (in state only); 307/766-2084.
Fax: 307/721-2084.
E-mail: wynot.uw@uwyo.edu.
Web: <http://wind.uwyo.edu/wynot/>.

For further information on any state technology assistance project, call that project at the number given or visit the project's Internet site where available.

State Protection and Advocacy Agencies

Most states also have a protection and advocacy agency (P&A) that provides assistance to persons with disabilities in accessing appropriate programs and services.

Alabama

Alabama Disabilities Advocacy Program
P.O. Box 870395
Tuscaloosa, AL 35487-0395
V/TTY: 800/826-1675.
E-mail: ADAP@law.ua.edu.
Web: <http://www.adap.net/>.

Alaska

Disability Law Center of Alaska
615 East 82nd, Suite 101
Anchorage, AK 99518
907/344-1002.

Arizona

Tuscon
Arizona Center for Disability Law
3131 North Country Club, No. 100
Tuscon, AZ 85716
V/TTY: 800/922-1447.
or
Phoenix
3839 N. 3rd Street, Suite 209
Phoenix, AZ 85012

V/TTY: 800/927-2260.
E-mail: center@acdl.com.
Web: <http://www.acdl.com/>.

Arkansas

Advocacy Services, Inc.
1100 North University, Suite 201
Little Rock, AR 72207
V/TTY: 800/482-1174
E-mail: panda@arkdisabilityrights.org.
Web: <http://www.arkdisabilityrights.org/>.

California

Protection and Advocacy, Inc.
100 Howe Avenue, Suite 235N
Sacramento, CA 95825-9968
V/TTY: 800/776-5746
E-mail: taymour@pai-ca.org.
Web: <http://www.pai-ca.org/>.

Colorado

The Legal Center
Denver
455 Sherman Street, Suite 130
Denver, CO 80203
V/TTY: 800/288-1376
or
Grand Junction
2829 North Avenue, Suite 205
Grand Junction, CO 81501-1501
V/TTY: 800/531-2105
E-mail: tlcmail@thelegalcenter.org.
Web: <http://www.thelegalcenter.org/>.

Connecticut

Office of Protection and Advocacy for Persons with Disabilities
60B Weston St.
Hartford, CT 06120-1551
V/TTY: 800/842-7303
E-mail: HN2571@earthlink.net.
Web: <http://www.state.ct.us/opapd/>.

Delaware

Disabilities Law Program
913 Washington Street
Wilmington, DE 19801

V/TTY: 302/575-0660
E-mail: BJHartman@diamondnet.org.

District of Columbia

University Legal Services/P&A
300 I Street NE, Suite 200
Washington, DC 20002
202/547-0198

Florida

The Advocacy Center for Persons with Disabilities
2671 Executive Center Circle West, Suite 100
Tallahassee, Fl. 32301-5092
V: 800/342-0823
TTY: 800/346-4127
E-mail: info@advocacycenter.org.
Web: <http://www.advocacycenter.org/>.

Georgia

Georgia Advocacy Office, Inc.
100 Crescent Center Parkway, Suite 520
Tucker, GA 30084
V/TTY: 800/537-2329
E-mail: info@thegao.org.
Web: <http://thegao.org/>.

Guam

Guam Legal Services
113 Bradley Place
Hagatha, Guam 69610
671/477-9811
E-mail: glsc@netpci.com.

Hawaii

Hawaii Disability Rights Center
900 Fort Street Mall, Suite 1040
Honolulu, HI 96813-9607
V/TDD: 800/882-1057
E-mail: pahi@pixi.com.
Web: <http://www.pixi.com/~pahi/>.

Idaho

Comprehensive Advocacy, Inc.
4477 Emerald Street, Suite B-100
Boise, ID 83706
V/TTY: 208/336-5353

E-mail: coadinc@qwest.net.
Web: <http://users.moscow.com/co-ad/>.

Illinois

Equip for Equality, Inc.
Springfield
426 East Monroe, Suite 302
Springfield, IL 62705
V/TTY: 800/758-0464

or

Chicago
11 E/ Adams, Suite 1200
Chicago, IL 60603
V: 800/537-2632.
TTY: 800/610-2779

or

Rock Island
1612 Second Ave.
P.O. Box 3753
Rock Island, IL 61204
V/TTY: 800/758-6869.

E-mail: contactus@equipforequality.org.
Web: <http://www.equipforequality.org/>.

Indiana

Indiana Protection and Advocacy Services
4701 N. Keystone Avenue, No. 222
Indianapolis, IN 46205-1554
V/TTY: 800/622-4845
E-mail: tgallagher@ipas.state.in.us.

Iowa

Iowa Protection and Advocacy Services
3015 Merle Hay Road, Suite 6
Des Moines, IA 50310
V/TTY: 800/779-2502.
E-mail: info@ipna.org.
Web: <http://www.ipna.org/>.

Kansas

Kansas Advocacy and Protective Services, Inc.
3745 Southwest Wanamaker Road
Topeka, KS 66510
V/TTY: 785/273-9661
E-mail: info@ksadv.org.
Web: <http://www.ksadv.org/>.

Kentucky

Department for Public Advocacy
Protection and Advocacy Division
100 Fair Oaks Lane, 3rd Floor
Frankfort, KY 40601
V: 502/564-2967
TTY: 800/372-2988
E-mail: mfitzgerald@mail.pa.state.ky.us.

Louisiana

Advocacy Center
225 Baronne St., Suite 2112
New Orleans, Louisiana 70112-1724
V/TTY: 800/960-7705
E-mail: advocacycenter@advocacyla.org.
Web: <http://www.advocacyla.org/>.

Maine

Maine Disability Rights Center
P.O. Box 2007
Augusta, ME 04338-2007
V/TTY: 800/452-1948.
E-mail: Advocate@drcme.org.
Web: <http://www.drcme.org/>.

Maryland

Maryland Disability Law Center
The Walbert Building, Suite 400
1800 North Charles Street
Baltimore, MD 21201
V: 800/233-7221
TTY: 410/727-6387
E-mail: philf@mdlcbalto.org.
Web: <http://www.mdlcbalto.org/>.

Massachusetts

Disability Law Center, Inc.
11 Beacon St., No. 925
Boston, MA 02108
V: 800/872-9992.
TTY: 800/381-0577.
E-mail: mail@dlc-ma.org.
Web: <http://www.dlc-ma.org/>.

Michigan

Michigan Protection and Advocacy Service

106 West Allegan, No. 210
Lansing, MI 48933-1706
V/TTY: 800/288-5923
E-mail: molson@mpas.org.
Web: <http://www.mpas.org>.

Minnesota

Minnesota Disability Law Center
300 Kickernick Building
430 First Avenue, North, No. 300
Minneapolis, MN 55401-1780
V: 800/292-4150.
TTY: 612/332-4668.
E-mail: selliot@midmnlegal.org.
Web: <http://www.mnlegalservices.org/mdlc/>.

Mississippi

Mississippi Protection and Advocacy System for
Developmental Disabilities
5330 Executive Place, Suite A
Jackson, MS 39206
V/TTY: 601/981-8207
E-mail: mospna@bellsouth.net.

Missouri

Missouri Protection & Advocacy Services
925 South Country Club Drive, Unit B-1
Jefferson City, MO 65109
V: 800/392-8667
E-mail: mopasic@socket.net.
Web: <http://members.socket.net/~mopasic/MOP&A.htm>.

Montana

Montana Advocacy Program
P.O. Box 1681
400 North Park, 2nd Floor
Helena, MT 59624
V/TT: 800/245-8743
E-mail: advocate@mtadv.org.
Web: <http://www.mtadv.org/>.

Nebraska

Nebraska Advocacy Services, Inc.
522 Lincoln Center Building
215 Centennial Mall South
Lincoln, NE 68508

V/TTY: 402/474-3183
E-mail: nas@navix.net.

Nevada

Nevada Disability Advocacy and Law Center
6039 Eldora, Suite C - Box 3
Las Vegas, NV 89146
V: 888/349-3843
TTY: 702/257-8160
E-mail: ndalc@ndalc.org.
Web: <http://www.ndalc.org/>.

New Hampshire

Disabilities Rights Center, Inc.
P.O. Box 3660
18 Low Avenue
Concord, NH 03302-3660
V/TT: 603/228-0432
E-mail: advocacy@drcnh.org.
Web: <http://www.drcnh.org/>.

New Jersey

New Jersey Protection and Advocacy, Inc.
210 S. Broad St., 3rd Floor
Trenton, NJ 08608
V: 800/922-7233
TTY: 609/633-7106
E-mail: advoca@njpanda.org.
Web: <http://www.njpanda.org/>.

New Mexico

Protection and Advocacy System, Inc.
1720 Louisiana Blvd., NE, No. 204
Albuquerque, NM 87110
800/432-4682
E-mail: nmpanda@nmprotection-advocacy.com.
Web: <http://www.nmprotection-advocacy.com>.

New York

New York State Commission on Quality of Care
for the Mentally Disabled
401 State Street
Schenectady, New York 12305-2397
V/TTY: 800/624-4143
E-mail: marcelc@cqc.state.ny.us.
Web: <http://www.cqc.state.ny.us/>.

North Carolina

Governor's Advocacy Council for Persons with Disabilities
1314 Mail Service Center
Raleigh, North Carolina 27699-1314
800/821-6922
E-mail: gacpd@ncmail.net.
Web: <http://www.doa.state.nc.us/doa/gacpd/gacpd.htm>.

North Dakota

North Dakota Protection and Advocacy Project
400 East Broadway, Suite 616
Bismark, ND 58501-4073
V: 800/472-2670
TTY: 800/366-6888
E-mail: panda@state.nd.us.
Web: <http://www.ndpanda.org>.

Northern Marianas Islands

Northern Marianas Protection and Advocacy System, Inc.
P.O. Box 503529
Saipan, MP 96950-3529
670/235-7274
E-mail: lbarcinasp&a@saipan.com.

Ohio

Ohio Legal Rights Service
8 E. Long St., 5th Floor
Columbus, OH 43215
V/TTY: 800/282-9181
E-mail: OLRS_Email@olrs.state.oh.us.
Web: <http://www.state.oh.us/olrs/>.

Oklahoma

Oklahoma Disability Law Center, Inc.
300 Cameron Bldg.
2915 Classen Blvd.
Oklahoma City, OK 73106
V/TT: 800/880-7755
E-mail: odlcokc@flash.net.
Web: <http://www.flash.net/~odlcokc/>.

Oregon

Oregon Advocacy Center
620 SW Fifth Ave., 5th Floor
Portland, OR 97204-1428
V: 800/452-1694

TTY: 800/556-5351
E-mail: welcome@oradvocacy.org.
Web: <http://www.oradvocacy.org/>.

Pennsylvania

Pennsylvania Protection and Advocacy Inc.
11414 North Cameron Street
Harrisburg, PA 17103
V/TTY: 800/692-7443.
E-mail: ppa@ppainc.org.
Web: <http://www.ppainc.org/>.

Puerto Rico

Office of the Ombudsman for People with Disabilities
P.O. Box 41309
San Juan, PR 00940-1309
V: 787/725-2333

Rhode Island

Rhode Island Disability Law Center
349 Eddy Street
Providence, RI 02903
V: 800/733-5332
TTY: 401-831-5335

South Carolina

Protection and Advocacy For Persons with Disabilities, Inc.
3710 Landmark Dr., Suite 208
Columbia, SC 29204
V/TTY: 800/922-5225
E-mail: info@protectionandadvocacy-sc.org.
Web: <http://www.protectionandadvocacy-sc.org/>.

South Dakota

South Dakota Advocacy Services
221 South Central Avenue
Pierre, SD 57501
V/TTY: 800/658-4782
E-mail: sdas@sdadvocacy.com.
Web: <http://www.sdadvocacy.com/>.

Tennessee

Tennessee Protection and Advocacy, Inc.
P.O. Box 121257
Nashville, TN 37212
V: 800/287-9636

TTY: 615/298-2471
E-mail: shirleys@tpainc.org.
Web: <http://www.tpainc.org/>.

Texas

Advocacy Inc.
7800 Shoal Creek Boulevard, No. 171-E
Austin, TX 78757-1024.
V/TTY: 800/252-9108.
E-mail: infoai@advocacyinc.org.
Web: <http://www.advocacyinc.org/>.

Utah

Disability Law Center
455 East 400 South, Suite 410
Salt Lake City, UT 84111
V/TTY: 800/662-9080
E-mail: info@disabilitylawcenter.org.
Web: <http://www.disabilitylawcenter.org/>.

Vermont

Vermont Protection and Advocacy
141 Main Street, Suite 7
Montpelier, VT 05602
V: 800/834-7890
TTY: 802/229-2603
E-mail: info@vtpa.org.
Web: <http://www.vtpa.org/>.

U.S. Virgin Islands

Virgin Islands Advocacy
St. Croix
63 Estate Cane Carlton, Frederiksted,
St. Croix, VI 00840
St. Thomas
9003 Havensight Mall, Suite 313,
St. Thomas, VI 00802
V/TTY: 340/772-4641
E-mail: viadvocacy@worldnet.att.net.
Web: <http://www.viadvocacy.org/>.

Virginia

Department for Rights of Virginians with Disabilities
202 N. 9th Street, 9th Floor
Richmond, VA 23219
V/TTY: 800/552-3962

E-mail: wareka@drvd.state.va.us.
Web: <http://www.cns.state.va.us/drvd/>.

Washington

Washington Protection and Advocacy System
180 West Dayton, Suite 102
Edmonds, WA 98020
V: 800/562-2702
TTY: 800/905-0209
E-mail: wpas@wpas-rights.org.
Web: <http://www.wpas-rights.org/>.

West Virginia

West Virginia Advocates, Inc.
Litton Building, 4th Floor
1207 Quarrier St.
Charleston, WV 25301
V/TTY: 800/950-5250.
E-mail: wvadvocates@newwave.net.
Web: <http://www.wvadvocates.org>.

Wisconsin

Wisconsin Coalition for Advocacy
Madison
16 N. Carroll Street, No. 400
Madison, WI 53703
V/TTY: 800/928-8778
or
Milwaukee
2040 W. Wisconsin Avenue, Suite 678
Milwaukee, Wisconsin 53233
V/TTY: 800/708-3034
E-mail: lorip@w-c-a.org.
Web: <http://www.w-c-a.org/>.

Wyoming

Wyoming Protection and Advocacy System, Inc.
320 West 25th Street, 2nd Floor
Cheyenne, Wyoming 82001
307/632-3496
E-mail: wypanda@vcn.com.
Web: <http://wypanda.vcn.com>.

Other Sources of Information

National Rehabilitation Information Center (NARIC)

<http://www.naric.com>

NARIC maintains an extensive collection of printed material pertaining to the procurement and utilization of assistive technology. The following documents from the NARIC library have been selected as being particularly useful for people searching for assistive device funding. Some of the publications are available on the Internet. Paper copies of most documents are available at a nominal charge. NARIC's contact information follows:

NARIC
1010 Wayne Ave., Suite 800
Silver Spring, MD 20910.
V: 800/346-2742
TTY: 301/495-5626
<http://www.naric.com>.

CHAPTER V

SUMMARY

Throughout this scholarly project process, we learned a great deal about the effect of mobility on pediatric development. Without the introduction of pediatric mobility, children are at a distinct disadvantage compared to their able-bodied peers, both cognitively and physically. Children who are unable to explore their environment are limited in their sensory experiences, thereby decreasing their cognitive functions that would typically result from having those experiences. They are in a position where their environment must be brought to them, rather than being able to explore it for themselves. Through the introduction of independent movement, children with disabilities are able to develop the necessary skills needed to function in all of their environments as well as actively interact with their peers. Some of the additional benefits provided by independent mobility include the development of problem solving skills, learning opportunities, and increased motivation to participate in peer-oriented activities.

This project was somewhat limited due to the lack of current research regarding the use of pediatric mobility devices. We were also limited due to the lack of information about various types of pediatric mobility equipment. The majority of the literature that currently exists is focused on pediatric wheelchair mobility. It would be beneficial for future research in this area to focus on the physical benefits of various types of pediatric mobility, as well as the emotional and psychological impacts.

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