Chapter 2 - Assistive Technology for Seating, Positioning and Mobility

Assistive Technology for Positioning, Seating, and Mobility

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Positioning, seating and mobility play a critical role in a student's ability to function in the academic setting. The first section of this chapter provides information on positioning and seating. The second part of this chapter addresses mobility. If a student requires special positioning, seating and mobility, an occupational or physical therapist on the team may be the best person to take the lead in determining the appropriate options.

Each of the sections of this chapter contains background information, current information and questions to guide you through the SETT process and the decision making guide, as well as a continuum for positioning and seating, and another continuum for mobility. Following that are references and information on resources for the specific items discussed in this chapter, including resources for further information on the topics discussed.

Assistive Technology for Seating and Positioning

Introduction

Students are required to assume many different physical positions during the school day. Most students have no problems managing the multiple positions that are required; from standing and walking to get where they need to go to sitting in various places throughout the day (desk, floor, lunch room, library, playground, etc.). However, when a child has physical challenges ranging from slight to severe, this automatic task can have a significant impact on their daily functioning. Focusing their attention on trying to maintain their body position takes attention away from academics and learning. Children with mild motor involvement may have problems that manifest in excessive movement in and around their seat and desk. Children with significant motor issues may have difficulty managing all aspects of their body including, head control, trunk control (required for a stable base to work from), and positioning of their extremities.

The seating and positioning part of this chapter is organized in accordance with the Decision Making Guide following the SETT format (Student, Environment, Tasks and Tool). The Student section will assist you in determining skills and abilities required by the student to address seating and positioning issues. The Environment section poses questions to consider concerning the impact of the students environment, the teachers expectations, and how the environment might impact on the choice of assistive technology. The section on Tasks discusses what is required of the student that the student is unable to perform at a level consistent with their academic needs and the goal of the task in order to appropriately choose an assistive technology solution. Following Tasks is a section on Tools beginning with the continuum of assistive technology to be considered organized from low to high technology. This is followed by a more extensive listing of tools and strategies under the continuum subtitles. The chapter concludes with a discussion of a feature match process. Chapter appendices include sample IEP objectives, references, resources, and product charts.

Seating and Positioning: Background

This section will focus on the basic body positions that are necessary in the school setting. The first part will address students with mild disabilities and the second part will address the students with significant motor impairment. This introduction is not mean to be all inclusive but to give the reader a basic understanding of some of the positioning issues seen in the school setting.

Students with mild disabilities

Students with mild disabilities have seating and positioning issues that are often overlooked as the focus of their program is on academics. However, these children may benefit from addressing their seating and positioning so that they can focus on learning. Some of the behaviors that indicate this may be an issue are: falling out of their chair; frequent changes of position; getting in and out of their seat beyond what is allowed; slumping over their desk; wrapping their legs around the legs of the chair; or propping themselves on other surfaces such as the desk or holding their head on their hand. These are indicators that there may be issues with core strength, muscle tone, fatigue, vision or other problems.

Desk/Workstation
One of the first issues to address is the desk or workstation. A workstation consists of many components and you must consider all to achieve an optimal workstation. The student's seating in relation to the workstation and the task is the first key component. Traditionally, seating guidelines have focused on the following:

- Feet resting on the floor - ankles dorsiflexed to 90 degrees
- Knees flexed 90 degrees
- Hips flexed 90 degrees
- Hips well back in chair
- Both arms resting comfortably on desk without causing shoulders to shrug

If the child is able to fit in the chair within these parameters, then the chair is an appropriate fit. This does not mean, however that this is the expected position for the student to be in during learning. Some seating and positioning experts (Bundonis 2003, Kangas 2000, Lange 2000) have found that active learning positions vary from this by bending the knee slightly from 90 degrees with the feet on the floor (feet may be asymmetrical), bending the trunk slightly forward at the hips and holding the elbows slightly more than 90 degrees. This position is similar to the one we assume before rising out of a chair without actually getting up. It offers a more dynamic support structure for the upper body, arms, and hands while engaged in activities at a desk.

A second component is the relationship of the chair to the work surface where the task is to be performed. Desk and chair heights are an area that can be easily overlooked. Adjust the chair and table height as needed to obtain proper positioning. A chair that is too high will cause the feet and legs to dangle from the seat of the chair or the child to slide forward with back rounded. A chair that is too low will also cause the child to sit in a position that will interfere with optimal

use of the arms and attending. A chair in which the seat depth is too long will cause the child to slump forward and be unable to use the back of the chair to support themselves.

Chair and table height adjustments are not just for students with motor impairments. All activity workstations should be reviewed for the students expected to work at them. Computer labs are a good example, especially at the elementary level. These students range in age and size making it hard to set chair and desk heights that fit that range (Strup, 2003). Adjustable seating and tables can decrease position issues and make computer activities a lot more comfortable for everyone. Monitors should be positioned at eye level or slightly below. When a monitor is too high students may have to extend their heads back to an uncomfortable position so the eye can look up to the screen. Additional information can be found in the article *Getting it Right: Computer workstation ergonomics for children* (Strup, 2003).

Increasing movement/alternate positions within typical seating

Students who move about the classroom may benefit from adjustments in their current seating to incorporate continued movement to keep them engaged. Students who fall out of their chair may need modifications to allow them to get movement in their chair and incorporate frequent changes of positions. They may also benefit from scheduling breaks to get in and out of their seat. Adding alternative seating (floor, beanbag chair, etc.) can break up long work sessions. Allowing the student to seek alternative way to support themselves such as laying on their desk, wrapping their legs around the legs of the chair, or propping themselves on other surfaces such as the desk may actually increase their learning. Additionally, holding their head on their hand, sitting on their feet and putting weight on their arms may also give them additional support beyond what is traditionally provided. Some classrooms allow students to work while lying prone (on their stomachs) on the floor. This gives maximum support for the trunk and arms and may make it easier to focus on the academic task they are trying to do.

Work or writing surface

In a typical work station the writing surface is horizontal. However, an angled writing surface may help students by providing a more optimal position in which to write. It encourages the student to position the hand with the wrist extended making it easier to grasp a writing utensil. It may also help with copying tasks. The eyes move from a vertical to the horizontal writing surface during copying tasks. For some, the visual information gets lost in the transition, greatly slowing the information transfer. By angling the writing surface the eyes stayed on the same plane and the copying may be done faster and with greater accuracy.

Students with significant disabilities

Students with significant disabilities often have one or more positioning/seating devices. They may use a walker, wheelchair, stander or other positioning device. There are several factors to consider: position within their seat; seat location; and accessing materials.

Positioning within the seat

Traditionally, seating guidelines have focused on the following:

- Feet resting on the floor - ankles dorsiflexed to 90 degrees
- Knees flexed 90 degrees
- Hips flexed 90 degrees
- Hips well back in chair
- Both arms resting comfortably on desk without causing shoulders to shrug

This provides anatomical and symmetrical positioning but may not be the best position for active engagement. Kangas and Lange, experts in the area of seating and positioning especially with regards to wheelchairs, promote alternatives to this position (Kangas 2000, Lange 2001b). They promote active learning positions that vary from the 90, 90, 90 position. The active learning positioning is described as bending the knee slightly from 90 degrees with the feet placed asymmetrically on the floor, bending the trunk slightly forward at the hips and holding the elbows slightly more than 90 degrees. This position is similar to the one we assume before rising out of a chair without actually getting up and offers a more dynamic support structure for the upper body, arms, and hands while engaged in activities at a desk.

The maintenance of the 90, 90, 90 position may still be beneficial for children when the task is safe transportation. On the bus or in situations in which the surface is uneven, systems that hold children in the 90, 90, 90 position with straps, bars, vests, etc. will protect them in the case of an accident, sudden stop or bump on an uneven surface. For more information on safe transportation, read *Safe Transportation for Students Who Use Wheelchairs on the School Bus* (Shutrump, S., Manary, M., Buning, M. 2008). However, it is becoming more acceptable to discontinue the strapping when the child is not being transported and is engaged in activity. Then the student can have some movement within the seating system.

Karen Kangas (2003) states, “Seating for anyone, cannot be a singular posture, and any singular posture without any inherent mobility within that system, cannot assist an individual in becoming independent in any task”. One seating solution is not adequate because students cross environments within and outside the primary classroom. Multiple seating and positioning options must be identified, each providing a dynamic situation that allows the student to progress toward independence.

Variables for Positioning within the Seat

There are many aspects to consider when determining the optimal seating and positioning for a student (Berner, T. (2007) Lange (2000e) 2000h, 2001b, 2007a). An OT approach to seating and positioning can be found in the Gregorio-Torres (2006) article *Wheelchair and Seating Evaluation.* Gregorio-Torres addresses the factors of seating including: medical; physical; ADL/IADL; environmental; and mobility. The importance of posture evaluation and body measurement is explained with regards to determining optimal seating. There are devices for positioning the pelvis, trunk, head, and extremities. The positioning chart at http://www.atilange.com takes each area and identifies the part of the body, problem, possible cause, suggestions for intervention and goals of the intervention. Starting at the pelvis and moving through trunk, hips, knees, ankles and feet, shoulders,

elbows and upper extremities and the head and neck area, this chart systematically organizes the body and how to best support it (Pedersen, Lange 2001).

Once the body has been positioned within the wheelchair, then other aspects of the wheelchair may be considered to facilitate optimal functioning of the student. There are systems that offer tilt in space and/or recline (Lange 2000c, 2000d). Changing the seating angle is also an area that may need to be addressed (Lange 2001a). Cushion choice may also affect the total positioning package (Lange 2007b). More detailed information can be found on these topics in the *Focus On* articles by Michelle Lange in *OT Practice*.

To gain a more in depth understanding of some of the wheelchair features, RESNA (2005, 2007, 2008) offers several position papers to help the reader gain additional information on features of seating with in wheelchairs. In addition to case studies, the position papers address the features of wheelchairs including elevating seat devices, wheelchair standing devices, tilt, recline and elevating leg rests. Standing and seat elevating features assist the student with activities of daily living (ADLs). The standing feature also assists the student with issues of range of motion/contractures, bone mineral density, vital organ capacity, circulation, tone, pressure sores, and skeletal deformities. There are also benefits to being in a standing position that include access to community environments, and vocational and recreational activities. Tilt and recline components of a wheelchair seating system may be necessary to address issues of postural alignment, function, physiology, transfers and biomechanical issues, contractures or orthopedic deformities, edema, tone, pressure relief, comfort or dynamic movement. For some students these features may be manual, but for other students providing power tilt, recline and elevating leg rests may give them control over these features.

Seat Location in Environment

For a student with physical issues it is important to consider a seating assignment with clear pathways to key areas they need to access such as exits, teachers desk, or shelves with frequently used classroom materials.

For students with attention or visual processing issues consider seating that offers clear sight lines to boards, wall references or other teaching areas. Keep clutter on the board and walls to a minimum. Items hanging from the ceiling can be difficult for a student to filter out. Use color or boarders to highlight key visual areas. Be aware of visual field cuts (lack of vision in part of the visual field) and position the student to minimize their effect. Talk with your OT or vision specialist for more specific information or ideas.

Accessing Materials

It is important to position students so they can easily obtain materials. Desk organizers or clip on holders for pencils can keep writing and fine motor tools ready and easily accessible. Easy in-and-out storage folders can be strapped to the desk or chair to keep homework and notes located in one area. Nearby surfaces or an additional desk that can

hold adapted equipment such as angle boards or provide room for additional storage may also be helpful.

Larger equipment or assistive technology devices such as an augmentative communication device or laptop computer can be positioned on a wheelchair or table by:

- Securing it to the lap tray or other work surface with Velcro™ or other temporary gripping material until the optimum location is determined and then permanently fastening it to a lap tray or table.
- Purchasing a mounting system specifically designed to mount the device on a wheelchair; mounting systems can be adjustable or permanently positioned depending on the needs of the student.

Remember that a device should be positioned within an individual's optimum physical and visual range. Placing a device on a slant board may facilitate positioning.

Using the SETT process and Decision Making Guide

It is intended that you use this as a guide. The Decision Making Guide follows the SETT (Student, Environment, Task, and Tool) format with a subcategory of Sensory Considerations included with Student and Environment. Additional categories include:

- Narrowing the Focus to help identify a specific task in order to select appropriate assistive technologies
- Implementation Plan to assign trials, dates, responsibilities and data collection
- Follow-Up Plan to set a date for the team to reconvene and review the student's progress

Again, this is intended as a guide; during the actual assessment process, each topic should be written in large print where everyone can see (i.e., on a flip chart or board). Information should then be transferred to paper for distribution, filing, and future reference. For more information about using the SETT process, please refer to Chapter 1 of this manual.

The questions posed in the guide are not intended to be all inclusive but rather to prompt the team to consider as many factors as possible in order to identify and ultimately try appropriate assistive technology tools and strategies for their students.

WATI Assistive Technology Decision Making Guide

Area of Concern: Seating, Positioning and Mobility

PROBLEM IDENTIFICATION

Student's Abilities/Difficulties	Environmental Considerations	Tasks
What are the student's abilities and difficulties related to seating, positioning and mobility? • Does the student have strengths in any areas that would facilitate their seating and mobility? • Does the student have issues in • Physical-Muscles- strength or weakness; Coordination or other physical issues? • Stability- trunk, extremities; standing, seated or other position? • Endurance-fatigues easily? • What is the student currently using for: • Seating? Positioning? Mobility? Transfers?	What environmental considerations impact seating and positioning? • Where is the student expected to move about? • Do different locations require the same or different types of seating or mobility? • Does the child have an environmental preference? • Does the child require physical assistance in some areas, but not others? (restroom, classroom, bus, etc.)	What task(s) do you want the student to do once they are *seated*? • Use hands? • Use device or learning tool? Stay on task? • What task(s) do you want the student to do once they are *moving*? • Get to and from class? • Move around in the classroom? • Participate in daily activities? • What does the child need to be provided with to be as independent as possible in regards to: seating, positioning, mobility? • Does the child need assistance with transfers, changing positions, accessing mobility or other devices?

Sensory Considerations	Narrowing the Focus
Hypersensitivity or hyposensitivity to stimuli such as visual clutter, different lighting; classroom and background noise; tactile stimulation-surfaces; awareness of physical space / personal space; other individual specific sensitivities	i.e. Specific task identified for solution generation

Solution Generation Tools & Strategies	Solution Selection Tools & Strategies	Implementation Plan
Brainstorming Only No Decision	Discuss & Select Idea from Solution Generation	AT Trials/Services Needed: Date/Length/Person Responsible **Follow-Up Plan** Who & When-- Set specific date now.

Important: It is intended that you use this as a guide. Each topic should be written in large print where everyone can see them, i.e. on a flip chart or board. Information should then be transferred to paper for distribution, file, and future reference.

Student's Abilities and Difficulties – Seating and Positioning

As a team, discuss what the student's abilities and difficulties are related to seating and positioning. Please complete and review Section 1 of the WATI Student Information Guide: Seating, Positioning and Mobility (Chapter 1, page 22).

Seating and positioning issues may be very evident or subtle. Some questions to help elicit information about the concerns in the area of seating and positioning are listed below.

- When does the student exhibit good/poor positioning?
- Does the student lean in a certain direction?
- Does the student hold their head, arms or other parts of their body in a certain way?
- Does the student have positioning issues all day or just at certain times?
- Where does the student have good/poor positioning?
- Does the student express issues or concerns about their position?
- Does the current seating and positioning promote or interfere with any activities?
- Does the student have safety issues with regards to seating and positioning?
- Are there barriers to seating and positioning within various locations around the school?

Sensory Considerations
Some students are adversely affected by environmental stimulation which other students can filter out or ignore. Some common factors which can impact a student's learning and focus include hypersensitivity or hyposensitivity to stimuli such as

- Visual clutter
- Fluorescent lighting versus full spectrum lighting
- Classroom and background noise
- Tactile stimulation
- Awareness of physical space
- Other individual specific sensitivities

Although these factors are not directly related to seating and positioning, they impact the student's ability to focus on instruction and learning so should always be considered.
Some questions to ask may include:

- Does the child respond differently to surfaces that have different types of tactile input?
- Are there issues with skin sensitivity due to tolerance of fabrics, splinting material, etc.?

Other Considerations
Each individual student has specific skills and areas of concern. Be certain to address those as you capture the particular traits of the student in this part of the SETT process.

Environmental Considerations – Seating and Positioning

As a team, discuss and write on chart paper any environmental considerations that might impact the student's seating and positioning, such as auditory or visual distracters, placement in the classroom, number of different environments or any other environmental impacts. Some questions you may want to ask include:

- What positions are required in different environments?
- What positioning/seating do most children use in the different environments?
- Which environments could have multiple types of seating available?
- Are some environments more amenable to different positioning devices than others?

Sensory Considerations
Different environments have different levels of sensory stimulation. If the team has determined that sensory impacts are influential for the student's learning, identify the sensory levels in each environment in which the student will be.

Assistive Technology: past and present
What assistive technology (AT) has been employed in the past or is currently used with the student? List all assistive technologies that have been used with the student. If some have been discontinued, make note of the reasons. Sometimes effective tools are discontinued for reasons that no longer exist such as computer conflicts, lack of training, lack of interest, or other reasons. Do not discount assistive technology that was previously tried and discarded. There may have been a mismatch between the assistive technology and the student's skills at the time. Differences in skill development, maturity, a different environment or other factors may make all the difference. If the student is currently using assistive technology note the AT used, location, level of effectiveness, trained staff, and any other issues that are pertinent to the student/building. Be certain to list low and high tech AT supports.

Tasks – Seating and Positioning

As a team, discuss and write on chart paper the tasks that the student needs to do.
One of the most important questions when assessing a student's need for assistive technology is: What are the tasks the student needs to do? In this instance what types of seating and positioning does the student need to have in order to perform the daily tasks? These are some questions to consider:

- What are the seating and positioning requirements for the various tasks throughout the student's day?
- Are there times that the student could use different types of seating and positioning?
- What are the most important tasks that the student must do each day?
- How does the seating and positioning of the student interfere with or support the tasks the student is required to do each day?

A Continuum of Considerations for Assistive Technology

Seating and Positioning

Standard seat/workstation at correct height and depth

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Modifications to standard seat or desk

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Alternative chairs

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Adapted/alternate chair, sidelyer, stander

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Custom fitted wheelchair or insert

Standard seat at correct height and depth
Many chairs and desks are adjustable. This can be the first way to try and fit them to the student. Often there are unused chairs and desks that can have the seat or desk height lowered permanently by cutting off the legs. Lateral support or foot support can be added to the chair if you or your maintenance person is handy with tools, equipment and parts that may be available at the school.

In the computer lab, adjustable seating and tables can decrease position issues and make computer activities a lot more comfortable for everyone. Ergonomic support such as wrist pads, smaller keyboards for young hands and angled footrests also add support. Monitors should be positioned at eye level or slightly below so students do not have to extend their heads back in an uncomfortable position to see the screen.

Modifications to standard seat or desk

Stabilizers
Nonslip surfaces - *Dycem*® or other type of non-slip surface can be applied to the seat of the chair to prevent sliding.
Theraband - *Theraband* stretched between the legs of the chair gives the student an additional way to stabilize their feet besides wrapping their feet around the legs of the chair.
Seat cushions - Seat cushions such as the *Disc cushion* or *disco junior* offer another way to prevent slipping. Some are inflatable to different levels, or the surface can be smooth or bumpy, depending on what suits the specific student.
Foot support – Put support under a student's feet to raise them and prevent the feet from dangling. Cardboard or wooden boxes can be used. Attaching them to the chair will insure that they are in the correct position when the child is sitting in the chair.

Desk or table top modifications to help stabilize - Changing the angle of the writing surface can provide stability to help compensate for low tone, abnormal reflexes or poor grip patterns. The wrist, when bent back into greater extension, can use tendon positions (called tenodesis) to assist or strengthen the grip while holding a writing tool. Use a slant board or by turn a three-ring binder sideways to achieve this affect.
Chairs with arms - Old wooden student chairs may have arms on the side that can be used to help students get lateral support, as well as using the boundaries of the chair to remind them to remain upright or to move themselves back into an upright position.
Additional stabilizers - Cushions, bolsters, rolled towel, blocks can also be used as needed to assist in positioning.

Movement enhancers
Seat cushions Seat cushions such as the *Disc cushion* or *disco junior*, while adding a nonslip surface, can also allow movement in the chair. The level of air in the cushion gives different degrees of movement that can help the child to stay alert.
Chair leg modifications Another way to provide movement while seated in the chair is to put a tennis ball on opposite chair legs. This makes the chair uneven and allows rocking in a safe manner as opposed to tipping up on two legs.

Alternative chairs
T-stool - A T-stool is a one-legged stool, often made from 2x4 lumber, in the shape of the letter "T". Although it may seem counterproductive to try and balance while working at a desk, some students focus and attend better when their body is engaged.
Beanbag chair - For students with fatigue issues you may want to find alternate work environments within the school day that allow the body to rest and yet still participate in classroom activities. A beanbag or bolster chair may be used for listening or silent reading activities.
Ball chairs - For students that have difficulty attending, sitting on a therapy ball or bouncy cushion can increase attention level for some deskwork activities.
Other Chairs - In therapy and special education catalogs there are numerous types of chairs that may assist students in sitting. Consult with your special education teacher, OT or PT to review these catalogs to see what is available. There are a multitude of devices. It is no longer necessary to try and make something for the student if it can be purchased.
Adapted/alternate chair, sidelyer, stander - Many companies also specialize in positioning equipment to meet the challenges of students with significant motor issues. Your OT or PT can be consulted to find appropriate types of devices for these students to encourage positional changes throughout the day.

Custom fitted wheelchair or insert
The industry that manufactures wheelchairs and seating systems has expanded significantly. There are premade systems as well as systems that are molded to fit the students' unique needs. Your OT or PT can help you find and fit positioning systems for students. Also wheelchair vendors will have additional expertise in these areas.

Types of support available include: head, trunk, hips, knees, and feet. Additionally, lap trays or other components may be added to the chair to increase positioning.

Narrowing the Focus – Seating and Positioning

As a team, identify by circling or other means those few tasks the student needs to do that seating and positioning will have the most impact.

After the team has generated a list of tasks that the student needs to do, you may want to refine the list to limit the tasks that the team (including the student) will focus on. Too many tasks can overwhelm the team. Introduction of too many factors and tools may reduce your ability to determine effectiveness. Maintain your original list of tasks and review it later. Some tasks may already be effectively addressed with the new tools/strategies that you are using. The tasks that remain can become your new focus at a later date.

Solution Generation: Tools and Strategies – Seating and Positioning

As a team, brainstorm and write on chart paper any assistive technologies &/or strategies you think will assist the student in successfully completing those tasks you identified.

The team brainstorms strategies and assistive technology tools that may be of benefit for the student to complete the identified tasks in the given environments. Do not critique or otherwise evaluate the suggestions at this time. List all suggested tools and strategies including those currently in use on chart paper for all to see. The tools and strategies discussed below follow the general continuum for seating and positioning. The continuum is generally organized from low to high Assistive Technology. It is not intended to be used as a step-by-step protocol for using AT tools with a student, but rather an organizational continuum of types of Assistive Technology.

Solution Selection: Tools and Strategies – Seating and Positioning

Use a Feature Match process to discuss and select those ideas, tools, and strategies that were generated during the solution brainstorming. Select those that best match the student, the environment and the tasks that need to be accomplished. Limit your selections to a reasonable number and prioritize them according to those that can be accomplished immediately, in a reasonable time period and those that will be considered at a later time or require additional or significant staff training.

Implementation Plan – Seating and Positioning

After tools have been selected and prioritized, identify any trials or services that are needed including procurement of trial materials, team member(s) responsibilities, start date and length of trial, training needed and any other student/staff specific issues. Be certain to identify objectives and criteria of performance to determine the effectiveness of the trials.

Assistive Technology for Mobility

Background
Classrooms are not static. Students need to move in, around or between them throughout the school day. For students with mobility issues, transitioning can add some additional challenges. Key areas to assess are school building accessibility, movements within the classroom, moving around a building, grounds and community and safe transport to and from the school or to and from school events. After the environment is assessed, the individual student's needs for mobility is the next area to assess. It is also important to understand the issues and barriers surrounding the provision of mobility devices for students.

School Accessibility
The Americans with Disabilities Act (ADA) has encouraged many schools to address accessibility. Room numbers in Braille, ramps on the side walk, wheelchair-friendly thresholds and elevators to reach upper levels are now in place at many schools so that all children can participate in rooms that were once not accessible to them. Additional information on ADA access requirements can be found on the ADA web page *www.ada.gov*.

Movement in the classroom
Envision a typical classroom. How are the desks arranged? Where are the key materials located? How many items are strewn on the floor? How wide is the space between desks? Are there clear pathways? Would you be able to negotiate the room with your eyes shut or roll through it in a wheelchair without bumping into things?

When a student with physical or visual issues arrives in the classroom it is critical to create an environment that accommodates their movement issues. When the issue is physical, what kind of equipment will the student be using to get around the room? They will need to move from desk to teachers' desk to small group tables. Are there pathways to these key areas that are clear and large enough to accommodate a walker or wheel chair as it goes past? Will the student need to transfer to and from a desk? Do they need rest breaks from the chair? Do they need varied seating for different school tasks? Is their workspace high enough to allow the wheel chair to wheel underneath the table? Working with the school's OT or PT can help to address these issues.

For a student with a visual impairment, many of the same questions may be asked. The student may use a cane to help them negotiate around the many potential obstacles in the classroom. Key tools like reference materials, desks or the pencil sharpener may need to stay in the same location. Creating materials, signs, and labels in a larger font or in contrasting colors make them easier to see and read. They also may need to be in accessible formats such as audio or Braille. Students may need to be seated within the classroom where glare from windows and lighting are not an issue while working on a computer or retrieving information from a white board. Materials on the floor that may not be "seen" and could trip the student. Working with the vision specialist can help address specific issues.

Moving around the building and/or community

Students with visual impairments will often work with an orientation and mobility (OM) instructor when they begin to travel around the building and out in the community. These instructors may be able to offer some helpful tips to use. Students may be working with tactile or auditory maps or compasses as they learn to find their way. Electronic location systems, such as GPS, can also help a student pinpoint where they are and locate a specific destination.

Efficiency of movement between locations, access to play ground equipment or some school locations may be affected by fatigue and/or pain for students with physical issues. Pain can come from many sources. Students may be fitted with orthotics or braces that help stabilize and/or position parts of the body as it moves. A therapist or doctor usually fits these. Bunched socks or a growth spurt can cause skin to breakdown so care givers should attend to complaints of pain or discomfort. They should also alert family, other caregivers and medical staff about reports of pain so that adjustments can be made, as needed. Pain may also come from lack of movement so frequently repositioning the student within their seating or between positioning devices may help relieve pain and may prevent possible skin breakdown with students who have limited sensitivity. Students may also use a walker or crutches. Allowing extra time for these students to move between classes or locations if needed is helpful. Lots of walking with braces or crutches can result in fatigue and make it difficult for the student to keep pace with peers. Using alternate transport such as wagons, tricycles or sleds to go out to the playground or on field trips can help decrease fatigue and make the trip much more enjoyable. Alternating between different types of mobility may also decrease fatigue. For example, using the wheelchair for long distances and crutches within the classroom is one way to reduce the fatigue component.

For students who have difficulty standing and moving on their own, a variety of wheeled vehicles, such as manual wheelchairs and strollers, may offer them increased movement opportunities around the school. For those students who can control where they go by steering or switch controls, a scooter or powered wheelchair can offer increased independence with regards to mobility. Special seating systems can be fitted by a therapist or doctor to help position a child for maximum function. Powered mobility is now being accessed by switches so even students with severe motor and or cognitive impairments can learn how to move within their environment using a powered wheelchair device (PMD).

Transportation

Students may ride a bus to school and use their wheelchair or a specialized seating system to maintain upright posture or safe positions while being transported on the bus. ADA requires that transportation be available for people who use mobility devices. For students who are unable to transfer into a vehicle seat a WC19-compliant wheelchair can enhance safety. WC19-compliant wheelchairs are tested to with stand frontal impact and have demonstrated structural integrity and crashworthiness. They have four labeled and easily identified securement points for the tie down straps. Additional information on WC19-compliant wheelchairs is available at *www.rercwts.org*. This site lists all the wheelchairs that are currently WC19-compliant as well as industry standards for WC18 wheelchair tie down and occupant restraints and WC20-crash tested seating systems for wheelchairs to insure safe transportation of students.

Individual mobility
Some students require different types of AT to enable them to move independently around their environment. They may require devices to position their feet or legs (AFOs), external devices to help them balance while walking (crutches) or they may require a wheeled mobility device, either powered by themselves or by mechanical needs. Many improvements have been made in both the manual wheelchairs and power wheelchairs. However, there are multiple issues and barriers to using mobility devices.

Issues/ Barriers

When using AT for mobility, there are numerous factors to consider. Carden, Potgieter and Woods (2006) surveyed therapists who work with students that need to use mobility devices, and identified a number of reasons that there is difficulty in using mobility devices. In researching the area of powered mobility for students, they found a lack of randomized controlled research. However, several themes arose in their search for literature to address the issue of powered mobility. Parental perspective and acceptance of disability, prediction for potential and/or maintenance of ambulation, the use of powered mobility as a therapeutic tool, the use of powered mobility with very young children, and lack of knowledge or access to equipment by the therapists were all factors in using powered mobility.

Parental issues
The issue with use of mobility devices from a parental perspective is that it is often seen as a last resort when the child has exhausted all other means of independent ambulation. Parents may think that by providing mobility they are giving up on ambulation. As often seen with voice output devices, parents and even professionals have made the assumption that if the device does the talking (or walking) for them, they will not learn to do it for themselves. Research does not support this reasoning in either the use of AAC or with mobility devices. Although considered logical deductive reasoning, if you use something to do the activity for you, you may not develop the skills. Bottos and Gerickle (2003) as cited by Carden et al point out the opposite—providing mobility through the use of a manual or powered wheelchair does not impede the development of ambulatory skills. Also, ambulation potentials can often be predicted by age three and even though students are able to ambulate either independently or with external aides, this does not mean that this skill will be maintained through adolescence and/or adulthood.

Another barrier in acquiring a mobility aid is that it is also a major milestone in the adjustment to and acceptance of the student's disability. Along with the thoughts of "giving up" on walking, use of a mobility device is a visual indicator that a student is disabled. Many parents of young children with disabilities are only beginning to go through the stages of grief associated with the acceptance of their child's disability. They may not be ready to make this step emotionally. It is important to educate them on the importance of using mobility device not only to move but also as a therapeutic intervention. Movement using a device can impact the student's cognitive, social, emotional and communication skills, just as development of movement impacts these areas of a typical student's development (Hardy 2003).

Early use of mobility devices

Early learning is impacted by movement. Therefore the early use of mobility devices can impact the students learning. The student's potential for ambulation can be predicted as early as age three. Even students with motor skill deficits who are able to walk may not be able to maintain this skill as they continue to grow through adolescence and into adulthood. Provision of mobility through manual or powered means does not impede the development of ambulation skills (Bottos and Gerickle, 2003). Just as most people use multiple means for transportation—walking, biking, public transportation, driving or other means to get where they need to go—so can the student with disabilities use multiple methods to get where they need to go.

Many authors have begun to address the unique needs of using powered mobility with students and very young children The consensus is that powered mobility should be considered as an option even for, if not especially for, young children [(Bundonis, 2003); (Buning, Angelo, & Schmeler, 2001); (Deitz, Swinth, & White, 2002); (Durkin, 2002); (Escobar, Leslie, & Wright-Ott, 2002); (Furumasu, Treft, & Guerette, 2002); (Hardy, 2004); **(**Kangas, 2006 **); (**Lange, 2000f); (Lange, 2000g); (Meyer, 2008); and (Nilsson, & Nyberg, 1999)].

Professional issues/barriers

The professionals who work with students with disabilities have a wide range of perspectives when it comes to the use of powered mobility. In their survey of therapists beliefs, (Carden et al., 2006) found several areas that impacted the decision-making process. Therapists' beliefs regarding readiness, safety, "driving" ability, powered mobility as a last resort, and full functioning before seeking funding were assessed and responses varied widely. Barriers to the therapists' prescription of powered mobility included a lack of confidence, lack of consistent format or framework, lack of trial equipment, difficulty in setting up access to powered devices for students with complex issues, lack of knowledge of whether or not the powered mobility could or would interfere with self ambulation and very long wait time frames (up to a year) to get funding for powered mobility devices.

Readiness/Safety

Therapists' beliefs about readiness for powered mobility varied widely. Readiness factors may include physical, cognitive, and sensory skills as well as a minimum age. Some students have been excluded because of these issues. However, more and more students are being considered for powered mobility despite significant issues in these areas. Mobility is not driving and students can, in a controlled situation, learn to move safely through their environment before they are allowed to roam free. Just as a parent stops their child from harming themselves if they crawl towards an open stairway, the powered mobility beginner can be assisted to be safe in learning to use a powered mobility device. The use of a safety switch or kill switch accessible to the caregiver will allow them to immediately cut off power to the wheelchair in the event of a safety concern.

Last resort

Some professionals also believe that mobility (powered or manual) may interfere with ambulation skills. Lack of access to evidence-based practice information or research articles can prevent the therapist from understanding the positive outcomes associated with the use of PMDs. PMDs have been shown to positively impact cognitive, social, emotional, and communication

skills. In addition to the lack of evidence supporting the belief that PMD will prevent or interfere with ambulation (Carden et al., 2006) cite Bottos and Gerickle (2003) in their findings that provision of mobility does not interfere with the development of a student's ambulatory skills.

Framework Issues

Cardin et al. (2006) also noted that therapists were concerned about the lack of a format or framework with which to evaluate the potential for powered mobility use. Trial and error, observation and simple checklists were cited as ways to assess the students, but varied between therapists based on experience, access to equipment and other factors. The lack of access to trial equipment, access methods, and seating and positioning equipment also impacted the prescriptive recommendations of powered mobility. Therapists also had concerns about the possible negative effect of powered mobility on ambulation indicating an inconsistent knowledge of powered mobility's influence on this skill.

Funding Issues

Funding is also a central issue. The time it takes to locate funding, use funding or the lack of funding as a guideline often impact who receives powered mobility. Schmeler, Boninger, Cooper, & Vitek (2002) provide a peer review of literature for justifications of seating and mobility interventions with their aim to "provide strategies in using evidence to justify the interventions". Despite the fact that it is likely that the majority of a practitioner's knowledge base comes from clinical experience and less on higher levels of evidence such as peer-reviewed research, it is paramount for those writing justification for funding to be familiar with literature that supports evidence-based practice in this area. This research addresses the importance of providing funding sources with evidence to support the provision of wheelchair seating and mobility interventions. Schmeler et al review targets, specifically ultra-lightweight manual wheelchairs, powered mobility, pressure reducing seat cushions and the clinical application of pressure mapping, as well as tilt, in space and recline seating. These areas are supported with evidence-based practice and or research that can help the practitioner who is writing a justification for these specific types of seating and mobility.

Funding is also influenced by the inability of therapists to have adequate time for the student to try the powered mobility. The student may need an extended amount of time to fully determine if they will be able to learn how to use the PMD. The funding sources may not pay for even a short trial loan. Often funding sources will not approve the prior authorization for payment unless the student has demonstrated proficiency. However, the student is unable to demonstrate proficiency without access to the device. Working with vendors to obtain trial PMDs may give some students enough time to demonstrate proficiency. Developing a program similar to WATI's *Independence By Design* wheelchair loan service may be another way to assist students with obtaining a longer trial access to a PMD.

Independence By Design was developed by WATI Director Jill Gierach with the assistance of Karen Kangas and Lisa Rotelli from *Adaptive Switch Labs (ASL)*. The goal of the initiative was to obtain 2 PMDs outfitted with digital head arrays, and train WATI OT staff on their use, both the PMD and the digital switches to access them. The procedures and forms were created, and supporting data was collected. For those interested in pursuing this model, please contact WATI. Current changes in technology have made using PMDs with many types of students with varied

skills much more easily accessible for therapists or others interested in determining if PMD would be beneficial to their student.

Access Issues

Another barrier to providing powered mobility to students is the need for a variety of access methods, ranging from the most common such as the joystick to digital switches. The joystick is often the first type of access tried, as it is readily available. If the student can be successful with it then there is no need to look further. However, the joystick can be difficult for many students with motor disabilities. Before looking further at other types of access methods, one avenue that can be considered is the use of programming changes. By changing the parameters of the different types of control, students may be more successful with the joystick. In the past, the wheelchair suppliers and vendors have maintained sole access to the controller or programmer of the powered wheelchair. However, as they see the benefit for more frequent changes in the control parameters, therapists are being given access to and training in the adjustment of the parameters. *Independence By Design (IBD)*, the WATI-sponsored powered wheelchair trial, has focused on giving the school staff and parents access to the control parameters and training on how to maximize these settings to increase student success in safely exploring their environment with their powered mobility device. The parameters of a powered wheelchair that most affect learning how to use the access method are: forward speed, forward acceleration, forward brake, reverse speed, reverse acceleration, reverse braking, turn speed, turn acceleration, turn deceleration, power level, torque. The fine tuning of these parameters can be an essential key to making the PMD responsive to the student but at the same time, not scaring the student by going too fast or reacting to quickly or slowly.

There are many different types of access or controls for PMDs. Ramsey (1999) and Sweet-Michaels (1999) also address the variety of access methods for controlling a powered wheelchair. Besides the joystick, the use of a switch-adapted proportional joystick, switched control (with and without proportional access), sip and puff, tongue activated keypad and the use of scanning with a switch are other examples of access methods. Different access points including the hand, chin, head, foot, mouth and tongue can be used. Different types of mounting devices, lap trays and other accessories can also be used to help meet the mobility access piece for more complex students.

Access to AT

When addressing powered mobility devices, another factor to consider is whether or not the student will need access to additional AT such as alternative augmentative communication (AAC), environmental control unit (ECU) or the computer. Lange (2000a) in the article *Interfacing Assistive Technology With Power Wheelchairs* provides examples of various AT and what to consider when in addition to a PMD, the student may also need other AT.

Feature Match

The use of powered mobility is a multifaceted decision-making process. Involving the entire team and including the parents or other care givers is vital for success. The feature match at the end of this chapter is a checklist of items that may need to be considered when determining what features of the powered mobility would be the best match for the student.

Using the SETT process and Decision Making Guide

It is intended that you use this as a guide. The Decision Making Guide follows the SETT (Student, Environment, Task, and Tool) format with a subcategory of Sensory Considerations included with Student and Environment. Additional categories include:

- Narrowing the Focus to help identify a specific task in order to select appropriate assistive technologies.
- Implementation Plan to assign trials, dates, responsibilities and data collection.
- Follow-Up Plan to set a date for the team to reconvene and review the student's progress.

Again, this is intended as a guide; during the actual assessment process, each topic should be written in large print where everyone can see (i.e., on a flip chart or board). Information should then be transferred to paper for distribution, filing, and future reference. For more information about using the SETT process, please refer to Chapter 1 of this manual.

The questions posed in the guide are not intended to be all inclusive but rather to prompt the team to consider as many factors as possible in order to identify and ultimately try appropriate assistive technology tools and strategies for their students.

WATI Assistive Technology Decision Making Guide

Area of Concern: Seating, Positioning and Mobility

PROBLEM IDENTIFICATION

Student's Abilities/Difficulties	Environmental Considerations	Tasks
What are the student's abilities and difficulties related to seating, positioning and mobility? • Does the student have strengths in any areas that would facilitate their seating and mobility? • Does the student have issues in • Physical-Muscles- strength or weakness; Coordination or other physical issues? • Stability- trunk, extremities; standing, seated or other position? • Endurance-fatigues easily? • What is the student currently using for: • Seating? Positioning? Mobility? Transfers?	What environmental considerations impact seating and positioning? • Where is the student expected to move about? • Do different locations require the same or different types of seating or mobility? • Does the child have an environmental preference? • Does the child require physical assistance in some areas, but not others? (restroom, classroom, bus, etc.)	What task(s) do you want the student to do once they are *seated*? • Use hands? • Use device or learning tool? Stay on task? • What task(s) do you want the student to do once they are *moving*? • Get to and from class? • Move around in the classroom? • Participate in daily activities? • What does the child need to be provided with to be as independent as possible in regards to: seating, positioning, mobility? • Does the child need assistance with transfers, changing positions, accessing mobility or other devices?
Sensory Considerations		**Narrowing the Focus**
Hypersensitivity or hyposensitivity to stimuli such as visual clutter, different lighting; classroom and background noise; tactile stimulation-surfaces; awareness of physical space / personal space; other individual specific sensitivities		i.e. Specific task identified for solution generation
Solution Generation Tools & Strategies	**Solution Selection Tools & Strategies**	**Implementation Plan**
Brainstorming Only No Decision	Discuss & Select Idea from Solution Generation	AT Trials/Services Needed: Date/Length/Person Responsible **Follow-Up Plan** Who & When-- Set specific date now.

Important: It is intended that you use this as a guide. Each topic should be written in large print where everyone can see them, i.e. on a flip chart or board. Information should then be transferred to paper for distribution, file, and future reference.

Student's Abilities and Difficulties - Mobility

As a team, discuss what the student's abilities and difficulties are related to mobility. Please complete and review Section 1 of the WATI Student Information Guide: Seating, Positioning and Mobility (Chapter 1, page 22).

What method(s) is the student currently using to move?

- What does the student need in order to move within and around his educational setting?
- What strengths does the student demonstrate that could assist with mobility?
- Does the student have any of the following skills either emerging or mastered: cause and effect, spatial relations, problem solving, ability to interact with their environment, motivation/initiation.
- What is the student's level of alertness?
- Are there behavioral issues (positive or negative) that could impact mobility?
- Is the age of the student a factor? (Students as young as 10-12 mos. can be considered for mobility devices.)
- Are there issues with strength, coordination, fatigue or other physical abilities?

Sensory Considerations
Some students are adversely affected by environmental stimulation which others can filter out or ignore. Some common factors which can impact a student's learning and focus include hypersensitivity or hyposensitivity to stimuli such as

- Visual clutter
- Fluorescent lighting versus full spectrum lighting
- Classroom and background noise
- Tactile stimulation
- Awareness of physical space
- Other individual specific sensitivities

Although these factors are not directly related to mobility, they impact the student's ability to focus on instruction and learning so should always be considered.

Other Considerations
Each individual student has specific skills and areas of concern. Be certain to address those as you capture the particular traits of the student in this part of the SETT process.

Environmental Considerations - Mobility

As a team, discuss and write on chart paper any environmental considerations that might impact the student's mobility such as auditory or visual distractions, placement in the classroom, number of different environments or any other environmental impacts.

Environmental considerations pertinent to the student's success may include:

- What are the areas the student needs to move in (maneuver about the room/school, travel from class to class, the number of class changes, sufficient time for transitions)?
- Are there adults that need proximity to the student (lecture or small group, the ratio of adults to students, does the student have an adult specifically to aid them)?
- What are the teacher expectations?
- Is the student positioned in clear view of the teacher, the board, or displays?
- Is there sufficient light, and is the board free of glare?
- Are there auditory factors such as the ability to hear the teacher; the level of auditory stimulation in the room, talkative/distracting students nearby, excessive noise outside the room?
- Does the student need background music in order to focus?
- Is there visual stimulation either in or outside the room or distracting clutter?
- Is the student able to organization their desk/workstation?
- What are the physical aspects of their work area such desk, chair, access to materials?
- Does the student need assistance with positioning to maintain good trunk stability?
- Do materials need to be stabilized for them to prevent materials from falling on the floor?

Sensory Considerations
Different environments have different levels of sensory stimulation. If the team has determined that sensory impacts are influential for the student's learning, identify the sensory levels in each of the student's environments.

Assistive Technology: past and present
What assistive technology (AT) has been employed in the past or is currently used with the student? List all assistive technologies that have been used with the student. If some have been discontinued, make note of the reasons. Sometimes effective tools are discontinued for reasons that no longer exist such as computer conflicts, lack of training, lack of interest, or other reasons. Do not discount assistive technology that was previously tried and discarded. There may have been a mismatch between the assistive technology and the student's skills at the time. Differences in skill development, maturity, a different environment or other factors may make all the difference. If the student is currently using assistive technology note the AT used, location, level of effectiveness, trained staff, and any other issues that are pertinent to the student/building. Be certain to list low and high tech AT supports.

Tasks - Mobility

As a team, discuss and write on chart paper the mobility tasks that the student needs to do.
One of the most important questions when assessing a student's need for assistive technology is: What are the tasks the student needs to do?

- How do the student's mobility issues impact their daily task performance?
- What tasks does mobility impact in a positive or negative way?
- Where does the student need to move on a daily basis within the classroom and between classrooms?

Narrowing the Focus - Mobility

As a team, identify by circling or other means those few tasks the student needs to do for mobility that will have the most impact.

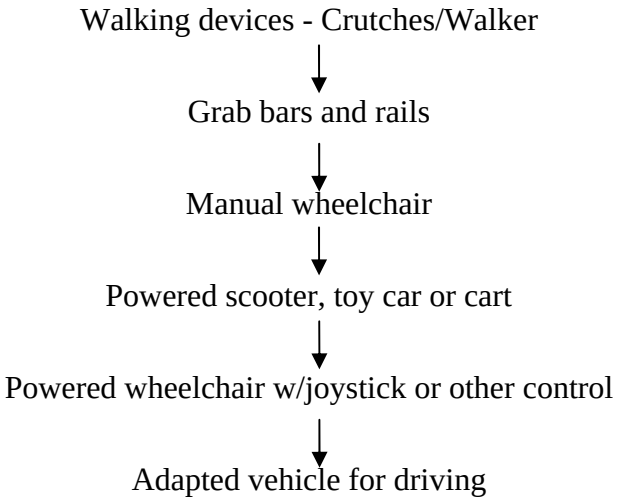
After the team has generated a list of tasks that the student needs to do, you may want to refine the list to limit the tasks that the team (including the student) will focus on. Too many tasks can overwhelm the team. Introduction of too many factors and tools may reduce your ability to determine effectiveness. Maintain your original list of tasks and review it later. Some tasks may already be effectively addressed with the new tools/strategies that you are using. The tasks that remain can become your new focus at a later date.

Solution Generation: Tools and Strategies - Mobility

As a team, brainstorm and write on chart paper any assistive technologies &/or strategies you think will assist the student in successfully completing those tasks you identified.

The team brainstorms strategies and assistive technology tools that may be of benefit for the student to complete the identified tasks in the given environments. Do not critique or otherwise evaluate the suggestions at this time. List all suggested tools and strategies including those currently in use on chart paper for all to see. The tools and strategies discussed below follow the general continuum for mobility. The continuum is generally organized from low to high Assistive Technology. It is not intended to be used as a step-by-step protocol for using AT tools with a student, but rather an organizational continuum of types of Assistive Technology.

A Continuum Of Considerations for Assistive Technology - Mobility



Walking devices: Crutches/Walker - Students who have difficulty with strength, balance or coordination may benefit from using external devices to support and stabilize them while they learn to walk or move from place to place. The PT will be able to assess and recommend the appropriate device as well as be able to correctly fit it and train others in its use.

Grab bars and rails - Since the advent of the ADA, most public restrooms have been equipped with grab bars and rails. These allow students who need additional support and stability to be as independent as possible. The height and diameter may influence the ability of the student to use the bars effectively. Grab bars may be also added to classroom areas.

Manual wheelchair - Students who have upper extremity strength and coordination but lack the necessary strength, coordination and balance in their legs may be able to use a manual wheelchair. Sometimes the wheelchair can be used for long distances to supplement students who are ambulatory for short distances.

Powered scooter or cart - Students who have use of their arms may benefit from using a powered scooter or cart. Generally less expensive than a powered wheelchair, this can give mobility to some students who are in need of powered mobility. Another alternative is the powered mobility car. The *GoBot* is an example of this type of mobility designed to give young children the ability to move while standing upright.

Powered wheelchair - Some students with significant motor disabilities may need to have a powered wheelchair to access their environment. Many new innovations have been designed to allow even the most motorically- or cognitively-challenged students to be able to access the controls to engage a powered wheelchair. There is a movement to get very young children into powered wheelchairs so they can begin to explore their environment through mobility. Students can control the wheelchair through innovations that allow a single-switch user to access the controls of the powered wheelchair.

Adapted vehicle for driving If a student is interested in pursuing driving a car, the student should be referred to an OT who specializes in driving evaluations and adaptations.

Solution Selection: Tools and Strategies - Mobility

Use a Feature Match process to discuss and select those ideas, tools, and strategies that were generated during the solution brainstorming. Select those that best match the student, the environment and the reading tasks that need to be accomplished. Limit your selections to a reasonable number and prioritize them according to those that can be accomplished immediately, in a reasonable time period and those that will be considered at a later time or require additional or significant staff training.

Implementation Plan - Mobility

After tools have been selected and prioritized, identify any trials or services that are needed including procurement of trial materials, team member(s) responsibilities, start date and length of trial, training needed and any other student/staff specific issues. Be certain to identify objectives and criteria of performance to determine the effectiveness of the trials.

Writing AT into the IEP

There are many correct ways to write AT into the IEP. It must be considered on the special factors form of the IEP and a listing of AT may be included there. It may be included as a related service and maybe also be included as a supplemental aid or service. (Purcell & Grant, 2002, 2004, 2007) and (Bateman & Herr, 2003) state many examples of writing present level of performance, objectives and goals.

The following is a four-step formula for writing an IEP goal.

Time Frame: In 36 weeks

Conditions: given a movement cushion

Behavior: Eric will stay seated

Criterion: during writers workshop

Another example would be the following:

Given access to a power wheelchair (condition), the student will move 10 feet forward (behavior) by hitting a switch (criterion) to get to a preferred place or activity 5 or more times within 10 minutes (time frame).

Feature Match

The following chart is an example of a way to organize the variables one may consider when assessing seating, positioning and mobility. By reviewing this checklist, the team can discuss the various components and issues with the vendor, funding source or any other interested persons. It is not meant to be all inclusive, but rather to generate ideas about what the child could benefit from in the area of seating, positioning and mobility.

Area	Specific issue	Concern Yes or No	Rationale or question
Family issues			
	Needs		
	Funding		
	Aesthetics		
	Transportation		
	Preferred vendor		
Environmental	Home		
	School		
	Community		
Physical parameters			
	Size		
	Weight		
	Growth		
	Width		
	Seat depth		
	Seat height		
	Power for other devices		
Manual W/C	Access		
	Ability to collapse		
Power W/C			
	Access: joy stick, switches, sip puff		
	Power tilt		
	Power recline		
	Sit to stand		
Seating			
	Pelvis		
	Trunk		
	Neck		
	Head		
	Legs		
	Feet		
	Cushion		
	Tilt		
	Recline		

	Elevating seat		
	Elevating leg rests		
	Sit to stand		
	Seat belt, Sub ASIS bar		
	Lateral support		
	Chest support		
	Head rest, support, strap		
	Arm rests, support, strap		
	Foots rests, support, strap		
Seating purpose			
	Functional use of head, arms		
	Transportation		
	Prevent address deformity		
Modifications			
	Need for short term modifications eg coat		
	Need for long term modifications eg growth		
Vision			
Vendor	Contact info		
	Access to trials		

(K. Stindt 2009)

Resources

Check list for choosing a wheelchair
http://www.healthcare.uiowa.edu/cdd/multiple/wc/wc_list.asp

Manual of Checklist for manually propelled wheelchairs
http://www.wheelchair.se/dokument/manual_english.pdf

Comparison of w/c electronics 6-1-08 M. Lange
http://atilange.com/New_wheelchair_electronics,%20final%20version,%206.08.pdf

List of support walkers and mobility devices Part of the Escobar article
http://www.seatingandmobility.ca/ISS2002/ToSunnyHill2/iss2002html/031_SELFInitiatedMobility.htm

Web sites
http://callcentre.education.ed.ac.uk/
Resources, publications, Smart wheelchair

http://www.daneverard.co.uk/mobility/article01.php
Support for early powered mobility

http://www.atilange.com/index.htm
Resources- positioning chart, Powered w/c electronics comparison chart, MULTI-FUNCTION ELECTRONIC AIDS TO DAILY LIVING Comparison Chart

http://www.wheelchairnet.org/
WheelchairNet is a virtual community for people who have a common interest in (or in some cases a passion for) wheelchair technology and its improvement and successful application.

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Products

Product	Vendor
Desk-a-Doo	Walker Enterprises
Dycem®	Sammons Preston Rolyan
GoBot	Innovative Products Inc.
Velcro™	Available locally
FitBall Balance Disc	Pocket full of therapy
FitBall Seating Disc Jr.	Pocket full of therapy
Move 'N' Sit Wedge® Seat Cushions	Pocket full of therapy
Bumpy Disc Junior Seat Cushion	Pocket full of therapy
"T" stool	School Specialty/Abilitations
Ball chairs	Pocket full of therapy
Bean Bag chair	Available locally
Thera-band	Thera-band
Switches	Adapted Switch Labs