

Young child, under 2 y. o., head array

Statement of Medical Necessity and Equipment Justification Powered Mobility Assessment

DATE/S OF ASSESSMENT: 6/20/01, 7/23/01

PATIENT'S NAME: Minnie Mouse

D.O.B.: 9/24/99 **AGE:** 22 months old

PARENTS: Mr. and Mrs. Mouse

MEDICAL DIAGNOSIS: Brain Injury due to Meningitis at 3 wks. old

THERAPIST EVALUATING: Karen M. Kangas OTR/L

OTHERS PRESENT: Preschool OT, O & M specialist, vision teacher, Dad, Mom

Identification of Needs

Minnie's brain on the right side was damaged (as reported and viewed by MRI) subsequent to meningitis as 3 weeks of age. Her mother reported that the physicians described to her it was as if Minnie had had a stroke plus some additional injury to her occipital and parietal lobes. However, as she continues to participate in rehabilitation programs and treatment, it is felt that it is critical to her continued development that independent mobility be gained.

At this time, Minnie is not yet able to sit up by herself, although she loves being seated. She is able to hold herself up in an upright posture when she is partially supported. She does demonstrate a hemiparesis, and is unable to crawl, ambulate or push in a walker or small manual wheelchair at this time. Minnie is a candidate for powered mobility. She is beginning to attend a preschool with children of her chronological age, and she needs to be able to participate within the environment. She demonstrates great curiosity and is using both her hands, but she cannot yet move independently to obtain objects, or to approach or leave a situation. It is critical that she continue to develop and gain in independent motor control and, this needs to include independent mobility.

In the past, we did not have equipment available to adequately support very young children like Minnie. Today, we not only have equipment which is small in size, we also have powered mobility equipment which is electronically programmable, due to its computer controls. This allows us to provide young children with independent mobility at this critical time of development when independent mobility is primary.

Trying to use manual wheelchairs at this age is still difficult, as they are often not narrow enough nor have they been created with a frame small enough to allow ease of access (arm length and hand grasp) to the wheelrims for a young child. In the case of a child with hemiparesis, managing manual wheelchair control would be very difficult at best, even if the equipment were available.

Minnie is a candidate for powered mobility. With very young children, again, powered mobility can now be supported without joystick control initially. With joystick control, the child had to control the joystick itself, and its combined functions of speed and direction. This required more than an interest in mobility, and is not "transparent" enough (efficient and readily able to be learned), for very young children. Consequently, again, their own need for mobility was not able to be met, as the system could be unmanageable. However, utilizing digital, alternative access with programmable electronics, removes these potentially safety problems, or lack of control. With digital control, the speed is pre-set and does not change. The young child must

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then only control direction, which is exactly what she would be doing if ambulatory, managing direction, going where she wanted to go. Adding head access to this, with zero pressure switches, now allows the child to gain upright posture, increased head control, and her eyes are facing the direction she wishes to travel. In short, this will now allow her to develop independent control of mobility, moving through her environment safely at slower speeds, yet with full and efficient control. This same electronic system, can then be programmed, and altered with increased speed, and control, including joystick control, as she gains competence. However, she does not lose precious time and its experience at this young age, but rather can support her continued own growth as it would normally progress. Minnie needs therapy, but she also needs independent control. Therapy assists in long term increased gains in postural control, but independence of movement, is also critical. This combination, of early independent powered mobility, and continued therapy will assist Minnie in gaining increased postural control, and control of her environment.

Medical Considerations/History

Minnie wears glasses. She does have some visual problems, but she does appear to have adequate visual skills to manage mobility. She was observed to be able to manage small hand toys like rattles, she looks to any person interacting with her, and she does appear to be drawn directly to objects visually. She does reach for things directly, after a visual gaze. Her vision may not be perfect, but it does certainly appear to be adequate to cope with mobility.

Minnie is reported to be currently medically stable. She drinks from a bottle, and is learning how to hold it herself.

Given her original diagnosis, it is difficult to believe that this lively, outgoing, charming young child had such a traumatic entrance to life. She does demonstrated developmental delays, but she also demonstrates continued changes in growth, and a great desire to continue to learn. It is important that she be supported as much as possible in her increased independent control.

Motor Assessment

Reflexes and Abnormal Muscle Tone:

Minnie does demonstrate hypertonicity on her left side, and it appears to be more in the lower extremity than the upper. However, as she is working at a task, grabbing a rattle, or shaking the belt to her high chair, her left hand will fist as she works hard with the right. The more involved left side, can be fully ranged, and it is a part of kicking patterns and reaches to mid-line. However, accurate, fine control does appear to be lacking due to the interference of this increased tone.

The increased tone is most evident when observing Minnie's right foot as she is on the floor, she still holds it in extension, even at the ankle, with her toes curled, often.

Range of Motion/ Motor Strength:

Minnie appears to have active range of motion on the right side, and can be fully passively ranged on the left.

Minnie does appear to have pelvic mobility and she does appear to have symmetry in her pelvis. She has been fitted with both AFO's (ankle foot orthotics) bilaterally, and a Boston Brace (a spinal orthotic) to assist her trunk in remaining symmetrical (with the brace on the involved side of the trunk is "stretched" to "match"

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the less involved side). This will continue to assist her in adequate body alignment and development and control as it assists her in a balanced posture.

She does reach with both hands, and both hands come together when she is mouthing a rattle, or holding her bottle.

Voluntary, Isolated, Controlled Movements:

Minnie demonstrates adequate head control, and is really working on supporting herself more in a seated posture. She still tends to lean to her one side, and does not yet mind if she falls over. When in prone, she is just able to push up, and she is beginning to roll across the floor for any independent mobility. When she is held in her mother's lap or lying supine and approached she can get very excited and shake both arms together. However, distal control is demonstrated more fully on her right side.

Minnie loves to hold her bottle, she also pulls her socks off when she is lying supine. She is an active child, and moves all extremities although, as stated above, she has less control on the left side. She is vocalizing, and making many noises, often appearing to begin to jargon, "sharing her opinion" on the current topic.

Accuracy, Fatigue, Endurance:

Minnie is a determined and curious child, persistent in her attempts to control her environment. She wants to reach out, to hold, to interact and to play. She reacts well to conversation, and participation in almost any task, with an adult, yet she is eager to explore on the floor, her toys, by herself. She is clearly delighted and delightful to be around.

Sensory-Motor Patterns and Processing:

Minnie's trunk can demonstrate postural insecurity, or a "collapsing" when held in an upright posture, with any pressure placed on her chest. This may be a contributing factor to her delay in learning to be seated, or simply a "symptom" of a lack of readiness. Postural insecurity is a demonstration of the body's reliance on its tactile input. Tactile sensation is the first sense fully mature in all human beings. In fact, it is mature at birth, and it becomes "over-powered" or "inhibited" as we age. It is our first line of protection, causing a "withdrawal" from any touch which is interpreted by the body as not "of the body." As the vestibular sense becomes more mature and active (the sense of balance and equilibrium) the tactile sense is not as active, as it does not need to be so much of a protection for the child. As balance and equilibrium develop, the child can then "protect" herself by moving away, independently, or posturally tolerating the touch without collapsing or withdrawing. It is very important to gain control "over the tactile sense" or "put it in its place" as the balance/equilibrium/vestibular sense develops. If not, the child's tactile sense, due to the body's apparent need for it, becomes stronger as it is "practiced" more, and the body uses it most regularly. However, if the body can gain in maturity, and the vestibular sense can be activated, its strengthening provides the body with a varied repertoire of responses. Consequently, it is very important to assist the child with postural insecurity in gaining vestibular control. To assist in this process, I have found that the use of a lightweight trunk orthotic when involved in tasks, allows the vestibular system to be more readily accessed. How? In two ways, first of all this orthotic is an actual barrier to the "touch" of the body, as the body cannot feel a single point of pressure while wearing it. Without a tactile reaction, the shoulder girdle and pelvic girdle are then able to communicate readily in righting and equilibrium responses, when the body is asked to hold while tasks are attempted.

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This second result, allows the body to continue to progress and mature, by “finding” its postural reactions. [With adults in rehabilitation treatment, conscious control of body postures can be encouraged and tactile reactions discouraged. However, with young children, whose bodies are learning how to act, as they interact with their environment, it is critical that support (not restraint) be offered, so that the body can most adequately interpret its postures and use them for continued development and control. This must be assisted in an “unconscious” method, as “consciousness” is not fully realized in a child who is first using postures.)

It is very important to stimulate righting and equilibrium reactions in children when they are young, so that the body has opportunities to use them. With children with motor delays this is often difficult. They can only really obtain righting reactions with the help of adults. And yet, when righting reactions are demonstrated, they are more like “reactions” to stimulation, rather than an inherent, and independent response as an interaction to a task. Using adequate seating, and trunk support with independent mobility opportunities with equipment (powered mobility), the vestibular system is stimulated and activated. As it is used, just like in all children, it can assist the body in practice and use of its righting reactions, its upright postures, and in support of weight bearing.

In Minnie’s situation, we can use a lightweight orthotic vest, with powered mobility, with digital, alternative access, and strongly encourage and support her own vestibular development.

Current Seating

Minnie does have a KidKart with lateral trunk supports, a high back and foot supports. This is supported, safe seating for travel when she goes out with her mother or family. However, she is not able to sit up within this system, herself. It, itself, does not encourage independent control, but is rather a safe stroller used to transport Minnie safely throughout the community. She is still small and often carried. As she is carried, she can clearly demonstrate head control, and some trunk control. She reaches out for objects, and can hold on to the adult. However, since the adult is holding her, she cannot gain pelvic stability when being held. Minnie needs opportunities to control her seating in independent ways while moving, or while playing with objects.

Current Body Measurements

<u>Seat to shoulder</u>	<u>12”</u>
<u>Shoulder to head</u>	<u>7 1/4”</u>
<u>Shoulder width</u>	<u>9 1/2”</u>
<u>Chest Width</u>	<u>7”</u>
<u>Hip Width</u>	<u>7 1/2”</u>
<u>Back of chair to BACK of knee</u>	<u>9 1/2”</u>
<u>Top of Knee to bottom of heel, L</u>	<u>8 1/2”</u>
<u>Approximate Weight</u>	<u>28 lbs.</u>
<u>Approximate Height</u>	<u>32 inches</u>

Current Means of Mobility

Minnie is able to roll around the floor in her home. However, she cannot do this in a play environment in a more public arena with ambulatory children safely, nor out of

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doors, readily. Although she is young, if she did not have any problems she would be ambulating quite well out of doors, and in the home and community, only needing supported seating when tired. However, Minnie is not tired, but does use supported seating, and her body is currently unable to support any real method of independent mobility. She really needs powered mobility for independent control, and for continued motor development.

Current Seating Recommendations

Minnie does need some trunk support, but not restraint. It is critical that she be able to use postural alignment, righting and equilibrium reactions, and develop pelvic stability. This comes from the body being challenged just enough while being seated. This usually occurs in much younger children, who are also smaller who are able to move from a pivot prone position to all-fours, or who can side sit or sit and move into all four's, and then back. Minnie is not developing this method of transition and control due to her disability. She is also getting larger than a child would be when regularly using these techniques or strategies of challenging and moving the body. This means as she gains in size, she has farther to "fall" or to "lean" and more to "control" as she attempts to move from one position to another. Consequently, she needs seating which does support her, yet which does not HOLD her still, or cause her to become passive. If she has opportunities to combine mobility with pelvic stability, the pelvic stability will have opportunities to increase in support, strength, and practice.

Minnie needs a seating system with a **scapular height back** (not higher) with both the **seat and back placed with a slight anterior tilt**, to assist her pelvis in a more active posture. She needs seating with **bilateral trunk supports** which are not holding or surrounding her trunk, but rather offer her trunk with physical cues as to its location and uprightness. She needs a **parallel to floor footplate** which will allow her to place her feet definitely, and in adequate alignment to her hips, so that her pelvis, again, can gain stability. She will need **small bilateral hip guides** to assist her thighs in remaining in alignment with her hips, but not preventing the pelvis from moving, nor the legs from weight bearing while holding her up. She will need a **padded pelvic positioning belt**, small enough in width to offer stability to the pelvis, and safety while traveling, but not too wide to over-hold her.

Equipment Trial

Equipment Used:

Invacare's **MKIV electronics** are the only programmable electronic controls in the USA which allow a chair to be programmed digitally for young children. Other chair's speeds can be controlled (and, in this case, slowed considerably), but only with Invacare MKIV electronics can the power level be adjusted also. This allows a powered chair to truly adapt to a child's needs and competence safely. The chair can be programmed to move very slowly, and safely, just like very young children move themselves. Yet, with the adjustment of the torque and power level, the performance or power of the chair can still be maintained. In other systems, if the speed is decreased dramatically (which it must be for very young children, or they will be "thrown" about as it starts or stops, or the chair can be too powerful, and if nudged against an object, "climb" it, and crash), the chair then almost cannot even traverse any carpeting, or a

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wrinkle in a sidewalk. However, with adjustment of the power level, a slow speed can be maintained, but power can be accessed to allow the child control in their environments.

Consequently, we needed to use **Invacare's pediatric powered chair**, with a manual tilt-in-space, too. The **tilt-in-space** is needed, especially here in Pennsylvania, so that the chair's user is not catapulted or even feels like she will fall out when managing a small hill, or dip. The tilt also allows the child to have some weight shifting ability, critical to her use when she uses the chair for longer periods. Its use can also assist in head righting, if the child is easily fatigued in the beginning.

Means of Activation:

To begin with, with children who are not yet fully sitting, it is most important to encourage increased body righting, equilibrium, and stability. This can best occur when the head is used as the initial point of access. The child then is automatically encouraged to remain upright to move. Also, the child's vision is will placed to see where the chair is going.

When a very young child is first using her hands, she watches her hands while playing. When using a powered chair, this is also true, however, when watching the hands, it is then difficult to teach the child to watch the environments. However, when using the head, the eyes automatically are moved to the direction the chair is moving.

With young children, especially those who exhibit any hypertonicity, it is critical that not too much coordination of strength, range and control are required. This coordination of skills is difficult for any young child, but particularly difficult for the child with motor problems. Consequently, we used proximity switches, or zero pressure switches, within a headpiece, for Minnie to control the chair. These switches, located within a padded head support, are only require skin touch "proximate" to them to activate. They can be touched, but they do not have to be held like a mechanical switch does. In the past, I used mechanical switches as they were all that was available. The child had to locate the switch, press it, and hold it for as long as the direction desired was needed. With proximity switches, the child need only move and stay in the direction needed, no pressure is required. This becomes very automatic, very quickly, and then the mobility is truly used as it should be, to go somewhere to get something. The hands are then, also free to reach objects and use them, once the mobility has been used to get there.

Results of Trial:

The only difficulty with our equipment trial today was taking a pediatric chair that was 14" x 14" size and trying to get seating within it, which was closer to 9" x 9" for Minnie's size. However, with lots of additional support to move the seat back, and extend the bracket on the head piece, I could get the head switches and the seating, just adequate enough to allow Minnie to use the chair herself. She loved making it go. We started in the garage and she turned to see each of her parents, and teachers. She readily controlled it to go, and moved her head off the switch to stop. It was such a hot day, and the seating was so tentative, that we could not drive any real long distance. However, today's trial certainly did demonstrate several issues; Minnie is not only a candidate for power, she can control a powered chair with the use of the proximity head switches, right now. She demonstrated going and stopping, on her own, and was eager to continue to move. She demonstrated the only prerequisites required to her

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candidacy for powered mobility: she understood what she was doing, she controlled the chair by going and stopping, she was eager to continue, and she controlled the switches without effort.

Now, we must develop seating, and access with the system itself, controlled and programmed through its electronics to allow her to manage the system independently, and for duration. The only time limit today, again, was that the system was not able to be “rigged up” adequately to manage her size, so that she could stay in it longer, and/or go much farther. With adequate seating, she is clearly able to manage mobility.

Powered Chair Recommendations

Minnie needs an Invacare Powered Tiger with programmable MKIV electronics and a manual tilt-in-space. This chair will allow us to create seating for her size, yet allow for growth, as Minnie grows. Invacare is the only company which makes programmable electronics flexible enough to utilize with a young child, yet allow for changes as her skills, and needs for mobility in multiple environments increases.

With this powered base, she will need **desk length height adjustable armrests**, so that she can approach a table or desk efficiently. She needs **90 degree swingaway footrests**, with **angle adjustable footplates** so that her feet can be adequately placed underneath her knees to support her pelvic stability. Although the angle of the footplate will begin at 90 degrees also, we need these footplates as they also **adjust to forward and rearward**, we will need that adjustment to accommodate her small size.

She needs **flat free inserts in the back 12” tires**, so that she will never have any problems of safety with a “blow-out” but rather can count on these maintenance free, full tires at all times. This chair as all powered bases, requires **two gel cell batteries**.

Minnie will be using **Adaptive Switch Labs’ pediatric head array with proximity switches** to drive with her head. (This is a padded head support with switches embedded into it, which are run by “skin touch” or in “proximate” position to the head. Minnie needs to go towards them, and/or touch the headpad, and they activate as “zero pressure” switches.) For this her chair will require the electronics’ configuration, that comes with **a visual display (and on/off toggle)**. The visual display allows the parents (initially) read a display to ascertain what mode the chair is in and also provides a visual text format for problems. The display also offers visual information regarding the state of the batteries (empty through full). The on/off toggle provided is for attendant control of the system. However, Minnie will also need to turn her chair on and off, so **a separate switch** will be needed for her to control that function independently.

For control of the chair for entry/exit into a van, or for transport, etc. the family will need **remote attendant control**, also available through Adaptive Switch Labs. **A remote programmer** is also a necessary item, so that the parents can alter the actual parameters of the chair as Minnie’s competence increases. The remote programmer also allows them to adjust the chair if veering occurs without a service call. It also contains various chair diagnostics which they can check and then call in for service. The service can be managed more cost effectively, as the supplier is then prepared for what ails the chair, and both parties can plan the service accordingly. Often, a service call

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and cost can be prevented, as an alteration to the chair's programming can occur, with phone technical support.

Training and Practice

With a powered chair, training will need to take place over time. On the day of delivery an initial lesson will occur. At this time, Minnie's family will be taught how to manage and maintain the chair and Minnie will have her first complete lesson. Then, a training schedule and plan will be made. It is critical that training occur at an individual and appropriate pace. Often, this lack of training is why a powered chair is never fully mastered. The chair changes the entire environment of Minnie and her family. ALL of them need to feel safe, secure, and competent in its use.

SPECIFIC EQUIPMENT RECOMMENDATIONS

*****Please note:** *These specific items are the exact items that this person needs. The specifications and brands themselves should **not** be changed. They have been chosen with great care, for durability, ease of use, compatibility, and accessibility and for this individual's own particular needs. (These prices are not exact but, approximate and current as of the time of the report, actual prices will come from the manufacturers, and the local medical suppliers, themselves, at the time of purchase.)*

1. Type of chair	approximate cost
Invacare Power Tiger	\$3269.+
w/tilt-in-space option	\$ 306.
w/10" x 10" frame width and depth	n/c
w/desk length, adjust. height armrests	n/c
w/electric teal frame color	n/c
w/6" x 2" front casters	n/c
w/90 degree swingaway front riggings	\$ 250.
w/adjustable, angle flip up footplates	\$ 109.
w/#1558M4 electronics	\$2527.
w/easy remote programmer	\$ 316.
w/gel cell batteries	\$ 300.

From: Invacare, 899 Cleveland St., Elyria, OH 44036-4028; 1-800-333-6900
Local: America's Best Supplier, Good old USA, 111-111-1111

2. Customized Adaptive Seating Insert

- a. Planar back, I-style, scapular height
- b. Padded, planar seat
- c. Bilateral adjustable, swingaway trunk lateral supports
flat pads, adjustable for summer/winter
- d. Bilateral adjustable angle, off set hip guides
- e. Moisture wicking, breathable, easy clean up fabric cover for back and seat
- f. Seat cover removable, or readily cleaned
- g. Quick -release brackets for all hardware, for ease of transport
- h. Head rest Mounting bracket for square tubing (for head array)
- i. Trunk bracket covers "booties" (to prevent any pressure problems as child's arm rests outside of trunk support)
- j. Padded Pelvic positioning belt, 1" wide, dual pull push button style
- k. Dynaform, extra small chest support, for travel

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*******Please note, the medical supplier and manufacturer can supply actual cost of these items which must be of the correct size for the patient and to match the chair and its frame. Please contact them for complete cost information.**

From: Adaptive Engineering Labs, PO Box 12930, Mill Creek, WA 98082-0930; 800-327-6080
Local: America's Best Supplier, Good old USA, 111-111-1111

3. Switches & Interfaces

- a. Pediatric size, padded 3 switch proximity switch head array
- b. With forward switch disconnect
- c. Visual display/hardwire configuration for mechanical switch control of on/off
- d. Remote attendant control
- e. With any voltage adaptors or cables required
- f. Two yellow TASH buddy buttons

*******Please note, the medical supplier and manufacturer can supply actual cost of these items which must be of the correct size for the patient and to match the chair and its frame. Please contact them for complete cost information.**

From: Adaptive Switch Labs, Inc., 125 Spur 191, Suite C, Spicewood, TX 78669; 800-626-8698
From: TASH, Inc., Unit 1, 91 Station Street, Ajax, Ontario, Canada L1S 3H2; 800-463-5685
Local: America's Best Supplier, Good old USA, 111-111-1111

4. Delivery Assembling, Instruction, Training

This is another critical piece of this entire chair actually working. This whole chair needs to be assembled and checked, so that each piece fits, and to change a piece if it does not. This system must be safe and fit Minnie adequately. This is the final customization and one of the most important parts of the entire process. Both the therapist and the dealer/vendor need to be involved, working together.

5. Choosing a medical supplier/dealer.

Mrs. Mouse has chosen America's Best as a local dealer, with my support. They have had a great deal of experience in seating and mobility, especially powered mobility. America's Best has demonstrated to me over the years, that they provide excellent technical and service support as well as remaining certified in installation and service by having completed the various manufacturers educational courses.

If there are any questions regarding the costs of the chair and the components, please call America's Best first, and/or the manufacturers. I have chosen the components based on my expertise as an experienced therapist dealing with seating and mobility of numerous patients for over 20 years. The choice of items is mine, the delivery and putting together is both the vendor/dealer's and my responsibility. Any cost questions are for the vendor. I choose products as to the patient's needs and the match between the features of the product and the needs of the patient, not their cost, but their value. If there are products which have equal characteristics and a price variation is noticeable, cost effectiveness is always considered.

If there are any questions or concerns regarding this report, please do not hesitate to contact me.

Karen M. Kangas OTR/L

Date

Occupational Therapist, nationally certified, and state licensed

Physician

Date