Statement of Medical Necessity and Equipment Justification
Seating, Positioning and Mobility Assessment

PATIENT'S NAME: Lucinda Jones
AGE: 31 years old
MEDICAL DIAGNOSIS: Cerebral Palsy
OTHERS PRESENT: Mom, RTS, personal aide
CONSULTATION LOCATION: patient's home
THERAPIST EVALUATING: Karen M. Kangas OTR/L

Medical Necessity and Justification for Equipment

Identification of Needs/ Medical Considerations/History

Lucinda has had a powered chair for many years. She then suffered an accident due to a fall during a transfer which required a cervical fusion, and an additional spinal rod embedded in the cervical area. This dramatically altered her posture and range of motion and control at her head and neck. She had previously driven her powered chair with single electronic switches (zero pressure proximity sensors) mounted within the headrest, and with two other separate mechanical switches to manage reverse and on/off. This configuration was now, not able to be reached nor controlled due to her altered limited postural control.

In addition, she needed her adapted seating to be altered. This required a new custom molded seating system, which was developed and delivered and configured within her older powered chair. Just as we were beginning to assess the new access methods, the powered chair died. The motors and the powered base were no longer working. This powered base was obtained in 1998, and held up surprisingly well. However, Lucinda is now in need of a new powered base, which additionally continues to provide her with powered seat functions. These powered seat functions are critical for changing position throughout. She continues to need powered tilt-in-space to alter the pressure on her buttocks to maintain skin integrity and to prevent any pressure sores (which she has had in the past), as well as supporting her limited head range of motion, since Lucinda can no longer tolerate being totally upright, and to support adequate respiration and swallowing. She needs powered recline to provide seating tolerance for up in the chair all day by also alleviating pressure by opening up the hip angle, and allowing her body to stretch out (again to prevent any future gastrointestinal issues which she has also had in the past). She needs powered elevating legrests to suppport her reclined position and to maintain muscle length in her lower extremities as well as preventing any circulatory problems due to inactivity and an extended upright posture. In addition, she continues to need the powered seat elevation, to allow transfers to be successful as the seating base can be accommodated to the surfaces of transfer, so that the transfer itself is not extended in duration or challenged in height variations, to prevent any future problems, and to allow Lucinda's head and neck to have the least amount of strain put on them.

Lucinda had a spinal rod inserted in the cervical area, in February of 2009 after a fall she sustained when being dropped by an attendant in a transfer.

Lucinda has a long history of multiple surgical interventions and their ensuing problems or resolutions. When Lucinda had spinal rod surgery originally (for her spinal scoliosis), in the next two years post-operatively she developed some pressure sores, which required dramatic seating changes. Lucinda has a baclofen pump, she does utilize a feeding tube (although still

consumes food by mouth), and she has had a history of a dorasl rhizotomy, various muscle lengthenings, and a spinal rod inserted to manage her spinal scoliosis.

It is critical that seating support Lucinda. She has had a long, past history (as stated above) of developing pressure problems, and skin breakdown if the seating is not fully supportive. She has also had a long history of digestive problems, which, again, can only be assisted, or prevented, by adequate swallowing and adequate nutritional intake while upright.

In addition to the acute problems discussed above, Lucinda's increased tone and spasticity appear to create additional issues for her when she has prolonged periods of inactivity and immobility. Having cerebral palsy is often not identified as a progressive disease, and as a disease it is not. However, its existence does create a medical fragility and vulnerability to increased tone, muscle atrophy and/or the development of contractures.

Consequently, a prolonged upright posture is critical and medically necessary for the support of the most basic and critical of health activity daily (adequate swallowing and adequate nutritional consumption). For Lucinda and her unique skeletal structure (she continues to exhibit a marked lordosis, and a pelvic rotation), this requires a custom molded system, that fits adequately. Her trunk needs to be in constant contact with the seat, and when that occurs, her head can exhibit additional range, and her tone can relax.

Patients with cerebral palsy are generally unable to "grade" movement. Control and stability occur with support, with supportive surfaces and on stable surfaces. Control also occurs during repeated practice and activity, as Lucinda could clearly demonstrate by controlling her powered chair and driving independently through the use of head switches. She is now unable to reach those switches, and unable to come off the back of the headrest, due to its need to "hold" her entire body within the seating system.

We have completed providing Lucinda's uniquely complex body with adequate seating. However, her body still requires changes in posture throughout the day, which now can only be met by getting back into bed (since her powered chair no longer works with its powered seat functions).

Lucinda needs to utilize her currently configured custom molded seating within a new powered mobility system which will include powered seat functions and a custom developed head array (electronic switches) for her to get back to independent driving.

Her current seating does fit her adequately, and is ready to be utilized in a new powered base. The only part not completed was the head support which will also include her driving controls.

Motor Assessment

Reflexes and Abnormal Muscle Tone/ Range of Motion/ Motor Strength:

Lucinda continues to demonstrate increased and high tone within her extremities, at this time more in the upper extremities than the lower, and at times, more distally that proximally. She has lost full passive range of motion distally and it is challenging to completely range her upper extremities except when she is reclined. When she is seated in an upright posture, and able to be fully supported, her upper extremities can release some tone. However, ever since her fall, the upper extremities remain in a hyper flexed posture, with internal rotation at the shoulder, elbow flexion, wrist hyperflexion and fingers fisted. Her lower extremities are able to be passively ranged with a small limitation in full knee extension. Due to muscle spasticity, Lucinda's muscle strength cannot be adequately assessed, however, her endurance to activity dramatically changed after the accident. She is now able to tolerate being up most of the day,

but we expect her to regain her full endurance when she can once again gain the benefits of altered position with powered seat functions and independent driving.

Voluntary, Isolated, Controlled Movements:

Lucinda's head remains her most consistent independent point of control. However, it has been altered due to the limitation now of the fused cervical spine. She is able to move it from side to side and forward, but she can no longer drop her head as she did in the past. Also, in the past, Lucinda was able to move her hands in more gross patterns, and with effort, but she could do this independently. However, she does appear to have lost this capability, although, in time, once she regains mobility, this may change as well.

Accuracy, Fatigue, Endurance:

It has taken quite some time for Lucinda to regain her endurance, and she still has a way to go. However, she is so eager to regain her driving, and with the use of the powered seat functions, it is expected that full daily endurance will return.

Sensory-Motor Patterns and Processing:

Lucinda's primary problems in the past (and which were frequently misunderstood) were her sensory processing problems. Lucinda continues to appear to demonstrate both motor apraxia and dyskinesia. She has difficulty sequencing motor patterns in any new situation, but once she learns a pattern (like driving in familiar environments) she is able to count on the automaticity of control. Her body more readily demonstrated its dyskinesia (a lack of "relationship" between shoulder girdle and pelvic girdle"; a lack of body awareness), previously to the spinal rod surgery. One unexpected outcome of the surgery has been Lucinda's body being more "one" or "one solid" responding mechanism, which has appeared to then offer some motor predictability to its use.

Current Seating

Custom molded seating was created for Lucinda to accommodate her body posture, provide her with adequate postural support and allow her to be seated adequately in an almost totally upright posture (as she can now tolerate given her new "head and neck" posture). This is usually the most complex part of Lucinda's functional needs. We are fortunate, that this has now been configured and solved, and only the powered base and its powered seat functions are needed.

When this seating was completed and then configured onto her powered mobility base, it was at this time, that the powered base finally completely stopped working. The seating created works adequately and will be able to be fit into a new powered base.

Current means of mobility

Lucinda has lost independent mobility ever since her fall in 2009. She really wants to be an independent driver again. The seating has been configured, the alternative access has been tried, she is now ready to get back to independent mobility.

Equipment Trial

Equipment Used

Due to Lucinda's motor apraxia, "new" is almost always a challenge for her. It is important to maintain how things work as much as possible for her, when change must occur. Consequently, when looking at a new powered base, it was very important for us to stay with the Invacare brand of chair as its electronics' and how they function is what Lucinda is used to, and will support her getting back to driving the most efficiently. However, when Lucinda obtained this last chair, it was a challenge for her to manage its larger base (from the pediatric base she

had in the past). Since she is a stable and low weight, we looked at not only the Adult TDX base, but also the Spree. These two mid-wheeled drive bases, allow a smaller turning radius, and with Invacare's electronics will replicate how Lucinda is used to driving, yet allow her to manage them as she does not have to "imagine" the longer base, nor practice a larger turning radius.

It was also critical that these bases be able to be managed by her Mom in getting in and out of their van safely. This can be a challenged when another adult must manage a chair that is driven by alternative access, and this will be part of the trial.

1. Invacare's TDX
2. Invacare's Spree
3. Various electonic switches, and varied head supports and arrays

Results of Trial:

The Invacare Spree worked especially well within Lucinda's home and in and out of the van. Its real differences between it and the TDX is its size. This smaller base will assist Lucinda in judging spaces, especially since she is in a new environment since her injury.

Lucinda can no longer lift her head off frequently, from a back pad, which is how she controlled stopping from forward in the past. She no longer has equal range of motion in both sides of her neck rotation either. Consequently, we need to have more adjustment in how her access is available to her. She can drop her chin, and move forward and the stop by moving back into her back pad. She sometimes needs the back pad for head support as well. We tried a fiber optic switch (again an electronic switch, so zero pressure, no pressure required to activate it, just locating the switch activates it), and brought it from below her chin, like a chin controlled joystick is set up for some patients with spinal cord injuries. Lucinda can come forward and use the fiber optic switch for forward. She then need one on the right side as she has less range here too. However, she can manage her left turning adequately, so a proximity sensory, like she had in the past, will work adequately there.

Powered Chair Recommendations

Lucinda needs the Invacare Powered Spree base with powered seat functions. Her height and weight are easily accommodated on this smaller base. This smaller base provides Lucinda with a smaller turning radius which is helpful in her managing her chair with her sensory processing issues. She will fit directly in the middle of the chair and be able to turn it without having to "judge" a larger back or front. As stated previously, Lucinda does have some sensory processing issues, but she is able to drive extremely efficiently in familiar environments, and each time she learns a new environment the learning is faster. With a smaller power base, this should assist Lucinda in quicker control and safe judgment in her current environments.

Lucinda also needs the ability to **tilt the seat**, which will alleviate any future pressure or skin problems on the ischial tuberosities. The tilting allows for a change in her body's orientation in space and pressure relief to her buttocks. When fully tilted she will need a **headrest** for safe support at that time. Since she operates the chair with her head, the headrest will need to be one which can allow for head support, as well as head control of driving. The tilting function also allows support for assistance in swallowing. The head can be supported, in a slightly flexed, yet upright posture, while the trunk is aligned to prevent swallowing problems.

The tilt function is also important in assisting postural control when managing hills, uneven terrain, or going down a ramp. The tilt allows the patient to be held in a posture which prevents the feeling of "falling out" of the chair.

Lucinda will also benefit from an **elevating seat** for a safer transfer for both her and her family and other caregivers. The elevation allows the transfer to take place at a safer level for both the patient and the caregiver. Seat elevation also increases visual range, especially when traversing indoor, unfamiliar or obstacle filled environments.

She also needs the powered **recline function**, which is especially necessary for Lucinda to open up her body at her hip angle, and allow herself to accommodate her pelvic posture and support her trunk (without which she could also develop pressure either on her pelvis, spine, or scapulae. This will allow her to "stretch" out during the day, instead of losing endurance and having to go to bed. The recline function is best known to be utilized **with powered elevating legrests**, which allows this full supine posture to be accommodated. However, reclining even 15 degrees, is important for postural change throughout the day. No one can sit in the same position all day, with the same relationship of the trunk to the floor, all human beings must be able to relax (open the hip angle, stretch out the trunk) and then come back up into a more upright posture in order to stay focused on tasks.

Lucinda needs the **powered elevating legrests** to allow for lower extremity stretching which also assists in the prevention of contractures or muscle shortening. The powered legs will require **calf supports** so that her legs will not "fall through" when she is tilted or reclined, and can be supported when they are extended.

With the use of powered elevating legrests, powered recline and powered tilt, simultaneously, the patient can also truly raise her feet above her heart, preventing any development of edema as she goes throughout the day, not standing and moving, due to her disability. As Lucinda ages, she spends increasingly more time in this system each day. It is vitally important that body movement continue to occur to maintain health to her circulatory system, her genitourinary tract, her gastro-intestinal system besides her musculo-skeletal system.

Changing positions within a seating system is critical. Often powered seat functions are thought to be "luxuries" rather than the critical, medically necessary changes in posture required all day, every day. Lucinda is no longer a young child. She is placed within her seating system in the morning, and is located in it, until bedtime. It is difficult for her to be managed by others out of her chair, and she is unable to change positions herself unless we provide her powered chair system with powered seat functions..

Movement within our seating systems is critical to all human beings. Our bodies digest better, void better, and are more alert after changing position. Our internal organs and their subsequent role in the physiological process of system function need us to change postures, especially moving upright against gravity, as well as moving into a seated posture, and a lying down posture to ensure adequate functioning.

Changing postures promotes increased respiration capacity as it allows the trunk to fully extend and subsequently the lungs to expand. Straightening the lower extremities (powered leg elevation) and matching it to hip extension (powered recline) allows the pelvis and hips to stretch out, allowing a different and more complete relationship with the trunk, shoulder girdle and head and neck. This adds to increased strength, control of posture, and range of motion in the head, neck and upper extremities.

The practice of moving from lying down, to a seated posture, to a tilted posture and then vice versa, also maintains the body's active alertness. Movement and mobility, control of

transitional postures, and change in body postures is the foundation for visual and perceptual attention, and focus. It is why we can become "antsy" or our "minds wander" if we are seated in one posture for too long a time. Providing equipment which will support movement in all planes, and replicate the transitions of movement is critical for anyone who does not control their own body's mobility.

Human beings require mobility not only of ambulation but change in position. Spastic quadraparesis and quadriplegia do prevent this, but with adequate adaptive equipment, these postures and mobility can now occur. Mobility is critical to stable and good health, including circulation, respiration, and elimination. It is critical that we provide our patients with the ability to be mobile within their seating systems, not just mobile within an environment.

With the electronics available today, (with microchip technology) programmability is available to the user. Chairs can be programmed to perform in a particular way. This is critical when using alternative access for control of the chair. The chair's speed is fixed, but with multiple separate drives, speed can be increased when needed. Lucinda needs accurate control of turning and the speed as well as the sensitivity of the chair's switches to its performance. She also needs acceleration and deceleration to assist her in higher speeds, so that there is a gradual change when she starts and stops. Otherwise, she could startle or be "thrown" and lose control of her already limited control when stopping or starting.

The **electronics** needed must have **multiple drives**, be **programmable**, and be able to accept alternative head switch access. Lucinda needs to be able to control all of the seat functions as well, through her head switch controller/array. She needs to be independent in not only moving through space, but changing body positions while seated throughout the day. If the system does not include separate drives, then Lucinda cannot truly have control of speed, as it needs to be "preset" due to her digital switch driving method.

In most powered chairs, when joysticks are used, both power and direction are controlled by the same "switch" or "driving method." However, when alternative switch access is necessary for independent control, then speed and direction are controlled separately. With separate drives, a drive can be preprogrammed for indoor use, with a separate drive for outdoor use, and/or control for safely getting into the van or into the house. These can be set up for individual environments and competent control for Lucinda.

Lucinda requires zero pressure, **electronic switches to drive,** 3 of them. In the past, these three switches were all proximity sensors which were located in three separate pads on a headrest. However, since Lucinda's injury and subsequent cervical fusion, she must now manage her chair differently. She can still easily reach a sensor on her right side, however, managing forward now needs to be managed by her head coming forward to touch a fiber optic switch which will be mounted on a adaptive "bib" assembly and with adjustable lock-tight tubing. A second fiber optic switch will need to be located on the left side (for left turning) also on an adjustable lock type tubing. Lucinda will need a head support with mini lateral pads, (the Stealth head support with mini lateral pads) which has arms which can be adjusted to place the pads right where they are needed. The Left pad will house a proximity sensor while the back pad and right pad will simply be pads to support the head. The forward switch and right turn switch will be fiber optic switches located within tubes which will be bent to exactly fit Lucinda when she is up and in her chair. The forward switch will be managed by her chin, and be located from a bib assembly, which lies on her chest, and has adjustable straps to fit around her neck. Then, the second fiber optic switch will be located and mounted off the same tubing used for her head support, and can then be bent to match her needs when making a turn. (This configuration

has been simulated with Lucinda before she obtained her new adaptive seating, and before her own powered chair broke down. It can readily be re-created with the Spree). This head array is also comfortable to use as a headrest.

When driving with alternative access, when body postures are limited and need to be controlled by changes within the system, a **visual display** is needed for the driver to have visual cues as to the chair's performance. This and the head switches (with the additional reset switch) are then the configuration which replicate the standard joystick. The **visual display** needs to be mounted on a a **stable mount**, so that it can be moved out of the way for transfers, but is not located in Lucinda's path when driving.

To program the chair's electronics, Lucinda's family needs a **remote programmer** for the controller so that her chair can be "programmed" for the chair's performance to match her specific needs within her environment, so that it can always be managed safely. This allows them to change the performance of the chair if it is needed in a particular situation, as well. Lucinda's family is quite adept at managing programmable electronics since she had them in her last chair, and since she utilizes an augmentative communication device.

Lucinda's chair and its seat functions also needs **"smart" actuators.** This means that the chair will be able to be pre-programmed to the exact desired amount of travel of each function, rather than having to hold down a switch as the chair moves through its range. For example, to enter a van, Lucinda's chair must be tilted dramatically, to get in through the doorway. Then, once in the van, the tilt has to be "un-tilted" so that Lucinda can be in a more safe upright posture. In the past, to manage the tilting function you had to hold down the switch on the tilt and "guess" how far you had to go. With a Smart actuator, the travel can be pre-determined and a single switch hit, will automatically move the chair just to the amount of tilt needed. This "smart" movement is critical when entering and exiting a van, when performing routines in specific environments, and when traveling in unfamiliar environments, and needing to access the tilting to safely traverse a trip downhill. The "smart" part is the pre-programming, and also the ability to simply hit the switch once, rather than having to maintain contact as the chair itself moves.

Another "smart" mechanism now available on the MK6 electronics is the **G-trac system.** The most difficult direction to maintain control over is forward, especially in PA and our tree ridden sidewalks and uneven terrain. Gtrac keeps the chair from veering. This will, again, provide Lucinda with increased efficiency not only in chair management and control, but in assisting her in a more even control of energy throughout the day traversing her various environments.

Lucinda's chair also needs **tires which are "flat free."** Trying to keep air in tires, at all times, or trying to manage a chair after a "blow out" is too much effort on everyone's part. It is a small safety feature, but a critical one, to have tires which will not go flat, or "blow out" and can be maintenance free.

Due to the cerebral palsy, Lucinda is non-speaking. Consequently she communicates with the use of an augmentative communication device. She uses a head switch to manage the AAC device. In order to use the same switch she will use for driving for accessing her AAC device, an **auxiliary control interface is needed** with its **specific cable** for her Dynavox. This will then allow the chair to be able to send a signal out to manage the AAC device.

Lucinda is totally dependent in transfers. When she is transferred out of her chair and into bed, it is very important that her chair then be re-positioned adequately for a safe transfer back into the chair. An adult should not be trying to manage a patient's chair with alternative

access through that alternative access. They could easily alter the driving mechanism, and alter its working positions, instead an attendant control is necessary. **This attendant control** is also then available to be used when assisting in entering or exiting a van, or when managing any new environment that is challenging, besides the every single day, repositioning of the chair for transfers in and out of bed, on and off the toilet and for bathing.

How will the chair be transported?

Lucinda is currently transported in her family's van. This was tested out in the equipment trial and the Invacare Spree does fit into the van and can be used adequately within the van currently available to Lucinda and her family.

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.*

1. Type of chair

Invacare's TDX Spree with MK6 (Mark 6) electronics
w/wheelchair transport brackets
w/flat free tires
w/Grape Madness frame color
w/Gtrac module
w/Harness required for expandable electronics
w/proportional attendant control
w/MK6 remote programmer
w/Auxiliary control module
w/wheel locks
w/battery charger
w/batteries

From: Invacare Corporation,One Invacare Way, P.O. Box 4028, Elyria OH 44036-2125;800-333-6900;
www.invacare.com
Local: Ms. Flint, BBB Health Systems

2. Powered Seat Functions

a. Powered Tilt in space
b. Powered Recline
c. Powered Legrest elevation
d. Powered seat elevation
With smart Actuators for tilt and recline.

From: Motion Concepts USA, 700 Ensminger Rd, Suite 112, Tonawanda, NY 14150; 888-433-6818
www.motionconcepts.com
Local: Ms. Flint, BBB Home Health Systems

3. Switches & Interfaces

a. Head Array configuration, on Stealth Head support with mini laterals
Proximity sensor on Left side pad; back pad and right pad, no sensors.
One fiber optic in lock assembly tubing on right side
One fiber optic switch in bib assembly (plastic) on chest for forward control

**This is a custom made system, except for the Stealth head array with mini lateral pads, that is a configuration ASL standardly provides, but only one pad will have a sensor in it, the other two will have fiber optic switches.

From: Adaptive Switch Labs, Inc., 125 Spur 191, Suite C, Spicewood, TX 78669; 800-626-8698;
www.asl-inc.com
Local: Ms. Flint, BBB Home Health Systems

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 Lucinda 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.

The Jones' have chosen BBB Home Health Systems as a local dealer, with my support. Their representative, Ms. Flint has had a great deal of experience in seating and positioning. They have demonstrated to me over the years, that they provide 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 Ms. Flint first, and/or the manufacturers. I have chosen the components based on my expertise as a therapist dealing with seating and positioning of difficult or complicated patients. 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.

Therapist **Date**

Karen M. Kangas OTR/L, nationally certified and state licensed occupational thearpist
Seating, Mobility, and Positioning Specialist, Assistive Technology Specialist, Consultant, Clinical Educator
6925 Upper Road, Shamokin, PA 17872; 570-644-1032; Email: kmkangas@ptd.net

---

Physician **Date**