

First Case Study:

Z is a 6 years old female diagnosed with Cerebellar Infarction, post pneumonia. She lives with her family and the mother is the primary caregiver. She has poor verbal communication and fair cognitive skills. In her ADLs, she requires moderate to maximum assistance and uses finger feeding for solid food. Her weight shifting skills are poor which puts her at a high risk of skin breakdown. She has a stroller, but the wheels are worn out and must be changed in addition to other parts as well.

MAT evaluation was done and according to it, she has posterior pelvic tilt and kyphotic posture, but both are flexible. She has fair sitting balance when sitting on the edge of the mat, her lower limbs are symmetrical in high sitting posture, fair upper limb functions, and inadequate head control. Moreover, she has an increase in muscle tone (flexor tone dominant), Bilateral Hamstrings and T.A tightness, and persistence of STNR, TLR, and ATNR.

Intervention:

A trial for dependent and semi active wheelchair was done. The child had the ability to hold the hand rim of the semi active wheelchair, and she started to initiate the propulsion while the mother was giving her verbal cues. The mother stated that the child would benefit from self-propelling.

A semi active wheelchair will be provided in order to facilitate independent wheelchair mobility and improve her upper limb functions, orientation, and exploration skills. There will be growth able and foldable options to allow further use in the future and these include adjustable axle plate with quick release option (*to adjust the center of gravity, seat to floor height, and camber*), full length height adjustable arm rest, and height and angle adjustable double foot plates. The wheelchair will also have 90-degree swing away hangers to make transfers easier, 1-degree camber angle, push handle, foot brake and anti-tippers.

Moreover, a solid contoured back rest, contoured head support, internal abductor, shoulder harness, padded hip belt with 45 degree of angle, ankle huggers will be added to the wheelchair to enhance upright and symmetrical posture as much as possible in order to reduce and prevent further deformities and facilitate awareness. A solid base pressure relief

moderately contoured cushion is chosen to provide comfort, protection and prevent skin breakdown while sitting. Finally, a detachable lap tray will help the child in feeding and even in schoolwork.

The measurements were taken:

Seat Width	14" (growth able to 2")
Seat Depth	18" set at 13"
Hangers Length	13"
Arm Rest Height	7"
Back Height	17"
Headrest Height	25"
Laterals Height	10.5"
Laterals Width	7.5"
Laterals Depth	6"
Back Width	14"

During the delivery of the wheelchair the caregiver will receive training and education on proper positioning and transfers.

Second Case Study:

A is a male diagnosed with CP. He lives with his family. He underwent surgery for right hip dislocation. He has fair cognitive skills and communicate verbally for his needs. Regarding ADLs, he is totally dependent. The patient has poor weight shifting skills which puts him at high risk for skin breakdown.

After conducting the MAT evaluation, the results showed that he has flexible neutral pelvic tilt, flexible right pelvic obliquity, and flexible scoliosis (convexity towards the right). Furthermore, the patient has inadequate head control, non-functional upper limb, sever generalized hyper tone, bilateral hamstrings, and T.A tightness, and persistence of ATNR, STNR, TLR. He also has poor sitting balance on the edge of the mat and high sitting posture with the lower limbs abducted and externally rotated in addition to the ankle being plantar flexed and inverted.

Intervention:

A dependent wheelchair mobility is recommended as he has nonfunctional upper limbs, sever tone and pathological reflexes. The wheelchair will have dynamic tilt in space option, dynamic rocker back rest (to absorb the energy that may damage the wheelchair or the user), rigid frame, 90 degrees hanger with a wedge from the seat pan 90 degrees. It will also have height adjustable double foot plate, full length height adjustable arm rest with standard guard, adjustable push handle, and brake system and anti-tippers.

To enhance upright posture, symmetrical pelvic and spine posture and prevent further orthopedic problems as much as possible, the following seating systems are recommended: foam in place back rest, external adductor, contoured head support, padded hip belt with 45 degrees angle mounting, and padded shoulder harness. Finally, a solid base pressure relief contoured cushion with right obliquity pad is chosen to prevent skin breakdown.

Measurements for the wheelchair:

Seat Width	18"
Seat Depth	15"
Hangers Length	15"

Arm Rest Height	7"
Back Height	22"
Headrest Height	32"
Back Width	18"

While waiting for the wheelchair to be delivered, the caregiver will receive training and education on proper positioning and transfers.

Third Case Study:

X is a 49 years old male who has CP, scoliosis, and chronic right hip dislocation. He has fixed pelvic obliquity, leg length discrepancy, and Kyphosis. He uses a powered wheelchair with a joystick control 12 hours a day. The wheelchair can also tilt to allow him to relieve the pressure. He received the wheelchair 8 years ago and now he is experiencing some difficulties with it. His contoured seating system has become flattened and this caused him to collapse toward his left side, so he requires frequent assistance for repositioning. As a result, he is experiencing pain and is at high risk for skin breakdown. He has limited wrist ROM.

He is independent in feeding only when the food is placed within reach so a lap tray would be beneficial to allow him to place things closer to him. He is currently having difficulty in reaching out for the tilt switch and requested it to be separated from the joystick as it is difficult to reach for the latter while the wheelchair is tilted.

Intervention:

Since he is collapsing toward the left side an angled, adjustable lateral trunk support is required. In addition, a countered back seat is necessary to accommodate for the kyphotic posture and a contoured seat is mandatory to accommodate the pelvic obliquity, leg discrepancy, and distribute pressure evenly throughout his body.

The tilt switch was placed at the end of the armrest to allow access for independent tilt and the joystick was placed close to his armrest. The lap tray was placed on the left armrest and it was contoured to avoid the joystick on the right side.

After deciding on everything X had to get a funding approval and then wait for the new chair delivery. Once the wheelchair arrived, the client was educated about the proper way of using it, the programming, and the battery charging.