CHOOSING A VEHICLE FOR CHILDREN WITH DISABILITIES
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As an Occupational Therapist working on a paediatric neuro-motor team at a tertiary centre, I receive referrals from local doctors and community Occupational Therapists who work with children and their families. In recent past, there has been an influx of referrals requesting recommendations for families who are in need of accessible, safe, transportation, options for their children with special needs. In a crash, the proper use of infant or child car seats can reduce the risk of death by 71% and the risk of injury by 67% (Weber, 2000; Wegner & Girasek, 2003). Like any child, infants and children with special needs must be provided with appropriate protection in vehicles. Transportation is a critical occupation of daily living, and quality of life is affected for those families who do not have means to get their children safely to medical appointments, or school or who cannot participate in and around their communities.

Children who have physical disabilities and cannot sit independently, hold their head in midline, or transfer in and out of a vehicle independently will most likely require modifications to their vehicle or car seating system. Transfers in and out of a standard car seat get increasingly difficult as children grow in both height and weight. Ease of transfers is also compounded if the child presents with fluctuating tone, rigidity, bony deformities and/or contractures. Children are unique, as compared to adults, when considering their transportation needs. For the most part, children do not travel alone and therefore the needs of the entire family need to be taken into consideration. As well, children grow, and their physical abilities and seating systems change. This complicates any equipment prescription, but is especially important when considering the expensive nature of making modifications to vehicles.

At the Stan Cassidy Centre, referrals are typically received when families are struggling with fitting their children into commercially available car seats, either because the children are too tall and lifting/manipulating them into the seat is difficult, or because the children have exceeded the 40 lb weight restriction of most commercially available car seats equipped with a 5 point harness. Often children have just been prescribed a wheelchair or specialized seating system and are no longer traveling in a commercially available stroller. Timing is often correlated with school entry, as families are required to problem solve transportation to and from school. Families often do not know what options for transportation are available to them.

Canadian Legislation

There is Canadian legislation requiring car seat use in all provinces and territories. Transport Canada has published guidelines surrounding the safety restrictions on car seats/seat belts for children. These guidelines can be found at [www.tc.gc.ca](http://www.tc.gc.ca). In general, they are as follows:

- **Stage 1** - Rear facing seat, 45 degree angle, with 5 point harness. Until at least 20 lbs
- **Stage 2** - Forward facing seat with 5 point harness. Until at least 40lbs.
- **Stage 3** - Booster seat with shoulder and lap belt. Must be at least 40 lbs.
- **Stage 4** – Only when the child is tall enough to have shoulder belt fall directly on shoulder.

Children 12 and under should always travel in the back seat. Weight and height always takes precedence over age, particularly since some children with special needs have developmental delays or are smaller in size for their age. Safety guidelines were created based on maintaining the integrity of the head, neck and spine of infants who have not yet developed head control and/or core muscle strength. Our children with neurological impairments, such as cerebral palsy often have impairments in their head and neck alignment and core strength. Transport Canada has published a best practice guideline for Health Care Practitioners (January 2008) entitled “Transporting Infants and Children with Special Needs in Personal Vehicles”. This document outlines the legislation surrounding conventional
car seats as they relate to children with special needs. Modifications to conventional car seats are not recommended. “While adapting a commercial product may be carried out routinely in clinical practices, it is not recommended as it nullifies the responsibility to manufacturers and/or importers and puts the clinician and their employer at risk” (Road Safety Transport Canada, 2008).

This document outlines safe practices used to restrain infants and children with special needs inside a vehicle when the children are NOT seated in a wheelchair. It reviews car beds, that are used for very small infants who cannot sit in a conventional car seat. It also reviews safety vests, which are used for children with severe behavioural problems originating form an underlying condition (ie/ autism), children with poor trunk control or children with certain types of casts (ie/ hip spicas).

Guidelines describe the need for medical equipment (ie apnea monitors, O2 tanks) to be anchored to the floor of the vehicles, in order to prevent injury in the event of a crash. It states that when possible, children with special needs should be transported in certified restraints such as car seats. If a child must be transported in a wheelchair, it is suggested that the chair be installed in a forward facing position with a Canadian Standards Association approved 4 point tie down device attached to the wheelchair’s main frame and the vehicle. The child should be restrained separately with the vehicle shoulder/lap belt (Committee of Injury and Poison Prevention, 1999). Lap trays should be removed in transit and brakes should be activated. If a child is in a power chair, the power should be turned off.

Assessment

When presented with an Occupational Performance Issue as critical as transportation, Occupational Therapists need to complete a thorough assessment. When purchasing an accessible vehicle, it is easy to get lost in all of the options and miss the critical elements that will make the difference between a good and bad decision. Purchasing an accessible vehicle is difficult – there are few people who can afford everything they would like, so it becomes a challenge to decide which features are necessary, and which ones are not. It is imperative that OTs use their dealers to help keep abreast of the myriad of options and equipment combinations that can be prescribed to help their families.

After it has been decided that the child will stay in their wheelchair during transport, and the family is looking for information on options and conversions available to them, it is imperative that information be gathered regarding the child’s seating system, physical/cognitive abilities and transfer methods, family needs and environment in which the vehicle will be used.

Key questions that need to be asked regarding the child’s seating system that will ultimately affect the modifications and options available to the family include:

1) Is the wheelchair manual or power?
2) Does it have a tilt option?
3) Is the seat height adjustable?
4) Does the child use multiple sets of wheels or cushions? Measurements that need to be taken as part of a initial OT evaluation include:

   Overall chair height, overall height of the child, seated in the chair, height of the top of the seat (cushion), maximum width of the drive wheels (taken close to the ground if there is camber), diameter of the drive wheels, and the length from the rear most part of the chair to the child’s toes. (Vehicle Selection 101 guide by NorCal Mobility, 2010).

The child themselves and the amount of assistance the child requires to transfer is another vital piece of the assessment puzzle. Children who can complete a standing pivot transfer, for example, may benefit from different equipment or different modifications to their vehicle as compared to a child who is completely dependent on their caregivers to be lifted in and out of the vehicle. Children who are expected to have surgery, particularly spinal surgery, need to have equipment that will accommodate for the potential for growth up to 6” – which can considerable change the conversion options for the family.
The family’s current vehicle needs to be evaluated. What works for the family? What are the concerns? How old is the vehicle? If it is a mini or full sized van, what conversion options are available? Families often have preconceived notions about brands of vehicles they will drive. Other considerations that need to be evaluated include clearance – does the family live in an environment where snow clearance, or steep inclines is an issue? How important are the cosmetics of the modified vehicle? Where do you want the child to be sitting? Are there any medical reasons for the child to be seated close to the front seat? Will the vehicle be used typically for day to day, in-town, driving or long distance traveling? How many passengers to you need to accommodate? Are there other children in car seats? What do the parking spaces /lots look like in the family’s environment? How much can the family afford?

Full Size or Mini Van

All vehicles have advantages and disadvantages: one advantage of a full size van is the extra space within the van for a wheelchair and other passengers and equipment. Some full size vans are too high for a normal size garage and lowered floor vehicles often cannot negotiate short, steep inclines of some driveways.

Most families of children seen at the SCCR choose a mini van. There are particular conversions that can be done with specific manufacturers. Doorway clearances of some side entry mini vans are greater than others. It is important to check with your dealer that the conversion options you are looking at even correspond with the van manufacturer the family is interested in. Advantages of a mini van include maneuverability and ease of parking, lower operating costs and better fuel economy. Often there is a door on the driver’s side for ambulatory passenger access. Lowered floor options are available on most models. Disadvantages of a mini van include less space inside the van as compared to a full size, and mini vans often require more modifications to accommodate a child in a wheelchair so therefore may be more expensive to convert.

Accessing the Van

Most vehicle modifications, particularly those with lowered floor conversions, will require a ramp – for either the child in their chair to be pushed up into the van, or the chair itself to be pushed up into the van if the child has been transferred to a car seat. Most minivans with ramps have a dropped floor (8-12”) and ‘kneeling’ capability to allow for easier access. Ramps may fold up into the doorway of a minivan or fit under the floor. Ramp options are endless. In-floor rams are stowed under the floor of the van and therefore do not block the entry way. Tall sidewalk curbs and the high snowy/slushy environment of the east coast may be difficult to negotiate.

Fold out ramps block the door when not deployed, and in a side entry model may mean blocking entry for ambulatory passengers. Typically there is often a second sliding van door behind the driver’s seat. Ramps are usually ~6 feet long and can be installed at the side or the rear of the van. Entrance through the rear requires the removal of the back row seating.

Platform Lifts can be installed at the side doors and in special circumstances in the rear of mini vans or full-size vans. There are some limitations and considerations regarding the use of platform lifts. A minivan with a side door entrance requires a smaller and lighter lift and therefore the size and weight of the wheelchair that it will lift is limited. As a general rule, if a wheelchair has an outside rim width greater than 25 inches then you will require a full-size van or a minivan with ramp access and a lift will not be appropriate. Some minivans have a ledge in their doorsill and thus cannot have lifts installed. Newer minivans, with side airbags or floor pockets for Stow ‘n’ Go seating also often do not accommodate a platform lift.

Lowered Floor and Raised Roof Conversions

The regular door height of most minivans is approximately 44” while the regular door height of a full sized van is approximately 48”. Generally speaking, if the seated height of the wheelchair and child is
greater than 48”, then a raised odor and a raised roof, OR a lowered floor with a lowered door will be required. Some wheelchairs tilt or recline which may make it easier to gain entry if need be. A lowered floor minivan is one that has had either a track or the entire original floor lowered between 8-12”. Lowered floor minivan conversions cost ~$17000 - $25000, including a simple fold out ramp and CSA approved tie down system. Lowered floor conversions will have decreased ground clearance.

Raised roof systems allow the increased door clearance and user headroom, though are more likely to ‘look’ like a handi-capped van. Ramps are not as readily available to meet the steep incline that is necessary to enter a van who’s floor has not been lowered. Families often consider the cosmetics of a lowered floor conversion versus the raised roof. It is often difficult to even notice that a mini van has been converted with a lowered floor.

**Side vs Rear Entry**

Another factor you need to consider when choosing an accessible vehicle for a child and their family is whether the child wishes to enter the van through the side or rear door. Side entry conversions with lowered floors seem to be slightly more expensive than their rear entry counterparts. In a rear entry lowered floor conversion, a track of floor is lowered, where as in the side entry versions the entire main frame and flooring is lowered. In a side entry conversion, access is granted via a low slope ramp, typically a fold out type ramp that rests on the inside of the passenger side door when not in use. The wheelchair can be seated anywhere in the back of the van, if the seats are removed. If the back bench remains the wheelchair may be tied down in the middle row, in any position. Loading/unloading onto a sidewalk is very convenient as compared to rear entry where off loading in parallel parking situation is not an option. Side entry requires sufficient space to turn the wheelchair around inside to face forward, therefore, positioning for other van seats is limited. The middle row seating needs to be removed.

Rear entry designs are a popular choice. Children in their wheelchairs can be seated next to other ambulatory passengers in the middle row. The rear entry design also removes a lot of the parking barriers that side entry designs must combat. Families can park in their garage, their driveway or narrower spaced parking lots and still have access in and out of the vehicle. Entry/exit, however is sometimes directly onto the road. The rear entry design makes it easy to enter/exit because caregivers do not need to turn the chair to a forward facing position. With a fold down bench option in the back row, a rear entry converted minivan can accommodate up to 7 passengers, including the child in the wheelchair. Seating options are plentiful. Rear entry conversions, such as the Viewpoint Van, are considered safer due to the new location of the fuel tank. Families who travel long distances need to consider storage, as the ‘trunk’ of the vehicle is used as an entry way, so luggage needs to be placed elsewhere.

**Wheelchair Tie Downs**

A wheelchair’s brakes are never enough for a child in a wheelchair to be safely secured while driving or being transported in a vehicle. For either the driver or passenger position, there are two types of systems to safely transport a wheelchair and its occupant; manual and electric restraints. The most common manual wheelchair tie-down is the 4 point system (ie/ Q straint), consisting of four straps that attach to the wheelchair and the van floor. A ratchet mechanism is used to tighten the straps. This system, when properly used, will safely secure almost any wheelchair. The systems are designed with low profile so that most wheelchairs can be moved into place without obstruction.

**Financial Assistance**

A new vehicle with the conversions necessary to meet the needs of your clients is expensive and can be an investment of up to $95000! Most cost between $40000 and $50000. There are programs that can be accessed for financial assistance. These will vary from province to province. Options to consider are:
1. Private insurance – some carriers will consider coverage of necessary modifications to a vehicle.
2. Companies that sell converted vans can offer financing for the van/conversion packages.
3. Many automobile dealers offer rebates of $500 to $1500 after the purchase of a vehicle to put towards the conversion price. See individual vehicular manufactures websites for more details.
4. Provincial governments may have transportation/retrofit programs that families may apply for. Ie/ The New Brunswick Vehicle Retrofit program offers up to $8000 to qualified families.
5. Funding organizations such as President’s Choice Children’s Charities offers grants to families who meet income requirements for up to $20000.
6. Income Tax rebates for the purchase of medically necessary equipment.
7. Fundraising initiatives that the family pursues on their own in the community.

References


www.tc.gc.ca


www.wheelchairvans.ca

www.presidentschoice.ca

Speaker Bio

Krista Fraser is a paediatric occupational therapist practicing on the Neuro-Motor team at the Stan Cassidy Centre for Rehabilitation in Fredericton, New Brunswick. She provides consultative service to the more complicated children in the province who have neurological impairments, including Cerebral Palsy. She works closely with the Adaptive Seating Department at SCCR, along with local community therapists and dealers when prescribing modified vehicles to their clients.