Lifestyle Guide

to Power Wheelchair Selection

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Motion Concepts

matrx SEATING SERIES

ASL

Choosing the most suitable power wheelchair for the user FWD vs MWD vs RWD

- Occupations/tasks/activities are the very essence of life and being able to fully participate in these is what helps contribute to an individual's quality of life. Having **the right wheelchair** is, therefore, essential to support participation of individuals with reduced mobility in activities that support and help enrich daily life.

Everyone is unique! To select the right wheelchair for an individual, the following should be considered:

Clinical needs + **Ergonomic needs** ⇒ **Seating**

Cognitive abilities + **Physical capabilities** ⇒ **Electronics/Control System**

Environmental factors + **Lifestyle** ⇒ **Wheelchair Base**

Performance

This guide aims to discuss the various performance benefits and areas of consideration of **FWD, MWD,** and **RWD** power wheelchairs. Informed decision making can help provide a solution that will enable individuals to live their lifestyle.

While there can be countless criteria to consider, two very important things are:

- Where the client spends most of their time – indoors or outdoors
- What they do in their wheelchair while indoors or outdoors

The wheelbase layout

Front wheel drive (FWD)

Mid wheel drive (MWD)

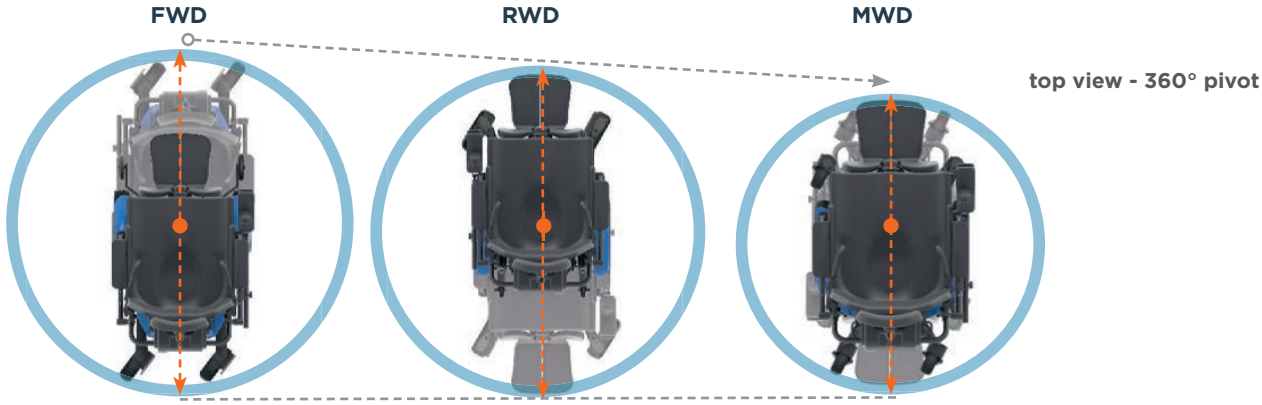
Rear wheel drive (RWD)

Indoors

Space considerations

Key constrains

The spatial layout of the indoor space where the client will spend most of their time is a key consideration as Power wheelchair bases vary in size.



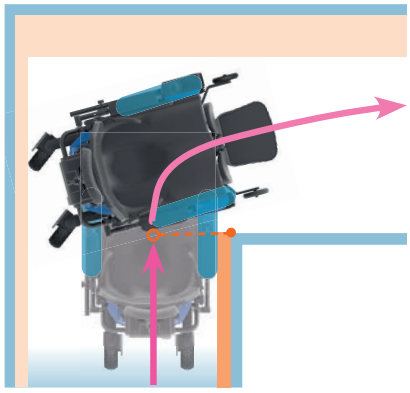
● **base turning diameter**

Things to consider in this assessment include dwelling entrance, hallway widths, room sizes, turning angles, doorways, floor surfaces, and other living spaces the client spends most of their time maneuvering through.

Indoor Environments	FWD	MWD	RWD
Narrow hallways	•	• •	•
Small rooms	•	• •	•
Elevators	•	• •	•

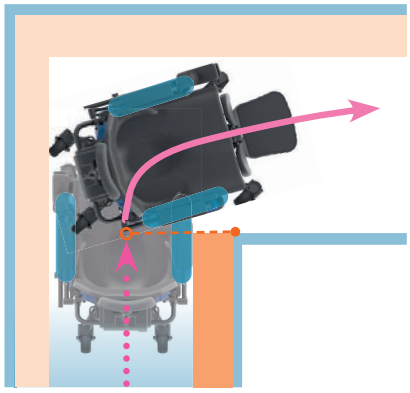
Maneuverability and turning in tight spaces

FWD ●○○



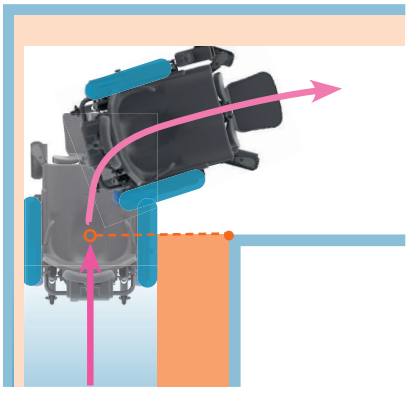
The **FWD** base has a bulkier rear end and requires more room behind it to make a turn.

MWD ●●○



The **MWD** requires the least amount of room to make a turn.

RWD ●○○



The **RWD's** bulk is in front of it so while it needs more room than the MWD, the client has more oversight during the turn than on the FWD

■ **proximity to wall**

relationship between corner and center of the wheel base

After considering indoor spatial needs which often tend to be small and tight, and typical indoor flooring, a general conclusion can be drawn that the base that best optimizes indoor driving is the **mid wheel drive.**

System Functions

Function	FWD	MWD	RWD
Tilt/Recline/Elevate	•	• •	•
Driving Elevated	•	• •	•
Reach Forward	•	• •	•
Standing	•	• •	N/A

Note: *Both Front and mid wheel bases can support ALL functions; however the mid wheel drive is better because all four casters can be locked to help increase stability.*

Outdoors

General considerations

Outdoor factors

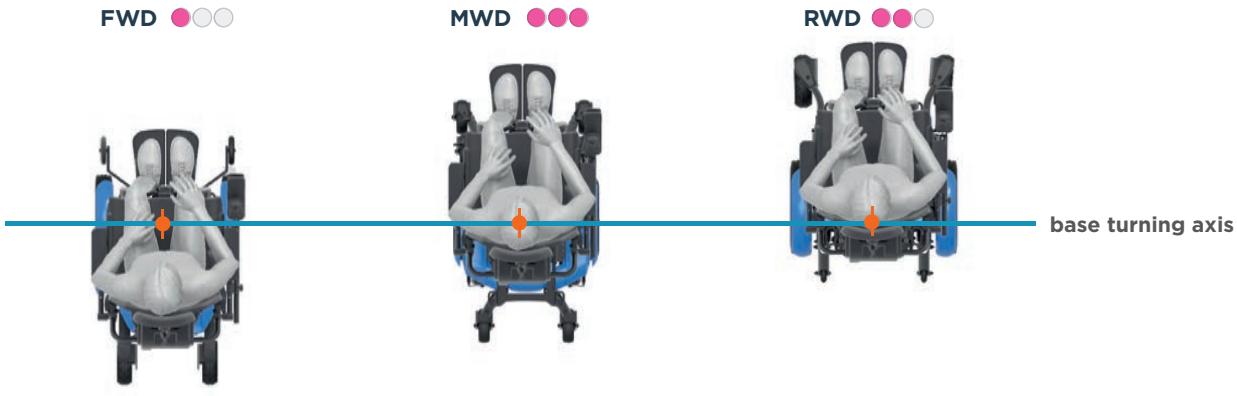
When a person is active outdoors then other factors need to be taken into consideration such as:

- **Drive Intuition**
- **Unpredictable terrain**
  - Navigating curbs/large thresholds
  - Maneuvering on slopes
  - Tracking on side slopes
- **Going longer distances at faster speeds**
- **Sports**

Let's explore some key factors to consider that help navigate a selection for the outdoor lifestyle. One thing to keep in mind is if the user is in a power wheelchair and is comfortable with the drive wheel location it might be better to keep them with the same drive wheel location **(FWD, MWD, or RWD).**

Driver intuition

The further the driver's head is from the center of the axis of rotation, the quicker the individual will perceive they are moving when turning, making it less intuitive to control. The closer the driver's head is to the axis of rotation of the chair when turning, the slower the individual will perceive they're moving. Turning with a **mid wheel drive** creates the most intuitive handling and controlled feeling for the user. Making a turn in a **front wheel drive** brings the head away from the axis of rotation, therefore, making it the most difficult to drive and control.



Unpredictable terrain

Navigating curbs/large threshold

Rear wheel drive navigates such terrain well because the large front caster encounters the curb first.

Maneuvering on slopes

FWD ●○○

A **front wheel drive** can make slope transitions with ease, but needs the front anti-tipper to help prevent tipping forward when descending a slope. These anti-tippers need to be raised high enough to prevent the drive wheels being lifted during the transition.

MWD ●●○

A **mid wheel drive** has fixed front arms that can cause the drive wheels to lift off the ground and lose traction when transitioning off a slope

RWD ●●●

The front castors of a **rear wheel drive** transitions on slopes with ease. Anti-tippers prevent the chair tipping backwards on inclines and the weight distribution over the rear wheels and forward placed casters help prevent the chair tipping forward on descending a slope.

Note: *In general, it is important to adjust the footplate height just enough to prevent hitting the surface of the incline during transition. Power tilt users may benefit from using slight tilt when driving down hills or declines, to improve ground clearance of the footplates and enhance postural stability.*

Tracking on side slopes

Gravity will have an impact on a powerchair while driving on a slope. Depending on the axis of rotation and where the most weight is distributed, the chair will veer downwards with the castors.

FWD ●○○

On a slope, the weight in a **front wheel drive** chair is at the back causing the rear castors to veer off in the downward direction of the slope. Veering is not so easily corrected, like it is with the rear wheel drive bases, especially at higher speeds.

MWD ●●●

Mid wheel drive provides little to no veering, as the weight is equally distributed between the front and back castors.

RWD ●●○

Weight on the **rear wheel drive** is in the front causing front castors to veer off downwards in the direction of the slope. This veering is easily corrected because the powered rear wheels push the chair forwards, helping to correct deviation of direction of the front castors.

Note: *Some chairs offer tracking technology designed to keep the chair on its intended path.*

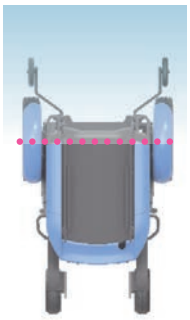
Outdoors

General considerations

Longer distances at faster speeds

When a user spends time outside driving, they want to get there fast and some chairs are easier to drive at higher speeds and require less input when traversing long distances thus reducing fatigue. A **rear wheel drive** base gives the best control when driving at speed and long distances because the steering happens at the back of the powerchair and not every small deviation is immediately translated in a change of course or direction. The opposite and least controllable wheelchair is the **front wheel drive.** The **mid wheel drive** will provide an average control of the powerchair.

FWD ●○○



MWD ●●○

RWD ●●●

Sports

Wheelchair users who participate in sports should consider the **rear wheel drive** because the bulk of the chair is in front of them giving them better visibility, and because the chair does not immediately change course or direction with every small deviation

Outdoor performance overview

Considerations	FWD	MWD	RWD
Driving intuitiveness	•	• • •	• •
Stability and ability to handle unpredictable terrain			
Obstacle handling (ascending)	• • •	•	• •
Slope transitions handling (descending)	•	• • •	• •
Tracking on side slopes	•	• • •	• •
Uneven terrain	• •	•	• • •
Getting to your destination quickly	•	• •	• • •
Going the longer distance (college campuses, airports, long commutes)	•	• •	• • •

After considering outdoor needs which often tend to be wide open, contain obstacles and slopes, a general conclusion can be drawn that the base that best optimizes outdoor driving is the **rear wheel drive** followed by the **mid wheel drive.**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FWD vs MW

Choosing the most suitable
primary considera

RWD

OR

Activities

- Participating in Sports
- Driving long distances
- Tracking at higher speeds
- Handling unpredictable terrain

Environments

- **Rural:** Parks/Trails/Farms/ Steep inclines
- **Urban:** Malls/Arenas/Campus/ Sidewalks

Other Considerations

- **Positioned for the best visibility**
  user able to see the whole chair in front of them

Activities

- Driving while elevated
- Driving long distances

Other Considerations

- **Standing for clinical needs**
  Utilize a Power Standing System
- **Most intuitive driving experience**
  Ideal for new user

Indoor activity
outdoor activity

VD vs RWD
power wheelchair based on
tions for the user

VD

OR

FWD

Environments

- **Areas:** Confined spaces/ Narrow hallways/ Sharp 90° turns/ Thresholds
- **Urban:** Malls/Arenas/Campus/ Sidewalks
- **Transit:** Public transportation
- **Surfaces:** Carpet/Smooth surfaces/Pavement

Activities

- **Moving between different rooms/Smooth surface transitions**
- **Helps increase ability to reach higher areas**
- **Handling unpredictable terrain**

Other Considerations

- **Standing for clinical needs**
  Utilize a Power Standing System
- **Positioning of lower extremities**
  Able to accommodate Larger Footplates

Environments

- **Areas:** Ramps/Thresholds/ Surface transitions
- **Rural:** Parks/Trails/Farms/ Steep inclines
- **Surfaces:** Carpet/Hardwood floor/ Gravel/Cobblestones

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