



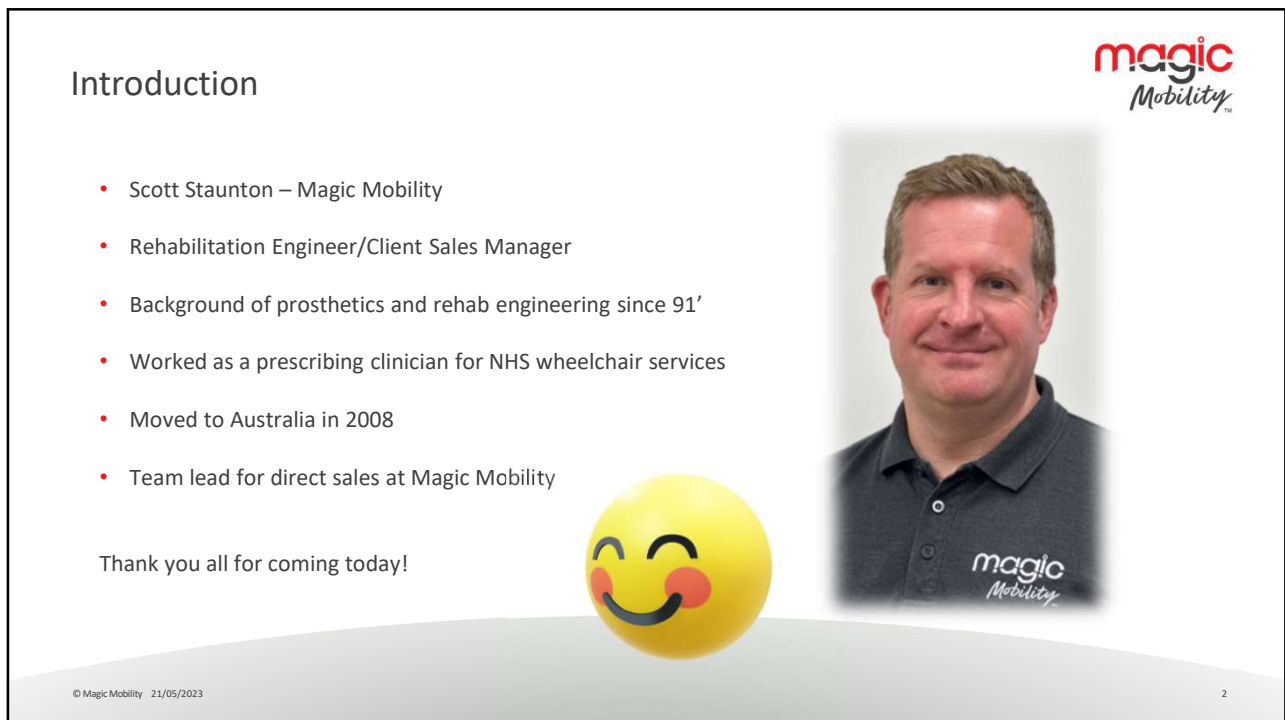
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**SUNRISE
MEDICAL.**

Need Not niche: Power Wheelchair Assessment to Provide Freedom & Function

May 25th 2023
Scott Staunton – Rehab Engineer / Client Sales Manager
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Introduction

- Scott Staunton – Magic Mobility
- Rehabilitation Engineer/Client Sales Manager
- Background of prosthetics and rehab engineering since 91'
- Worked as a prescribing clinician for NHS wheelchair services
- Moved to Australia in 2008
- Team lead for direct sales at Magic Mobility

Thank you all for coming today!




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Overview

The challenge and goal for therapists when evaluating for appropriate powered mobility is knowing the available technology to enable maximum independence and function for accessing all aspects of daily life.

This session gives participants a good understanding of assessment processes for powered mobility, helping facilitate client engagement and maximise independence and function.



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The goal – Assessment & fitment

- Promote efficient mobility
- Redistribute pressure/protect skin
- Improve independence
- Maximise function
- Improve posture (promote good enough posture that leads to increase in function)
- Manage tone (high tone or low tone)
- Manage spasticity
- Prevent further deformities



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Need Not niche – part of the process



ADVENTURE – how you push your boundaries, experience excitement, and add memorable new experiences to your life

TRAVEL – how you go beyond your local environment to see new places, meet new people, or simply get on with other things you need and want to do in life

SOCIAL – how you engage with the people around you and play an active part as valued member of your community and society at large

WORK – how you do the work you need to make a living, manage your everyday life, or give back as a productive contributor to your employer and community

FAMILY – how you play your part as a child, parent, grandparent, sibling, or member of your broader family

RECREATION – how you like to spend your spare time doing the activities you most enjoy

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Adventure & recreation

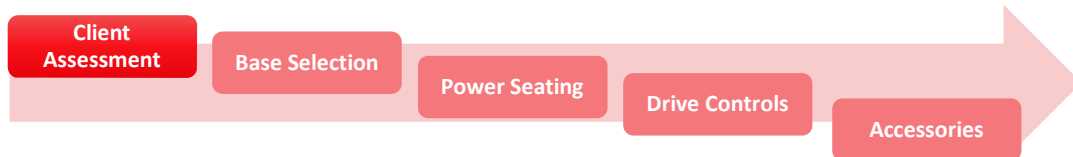


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The assessment process



Creating Successful Outcomes

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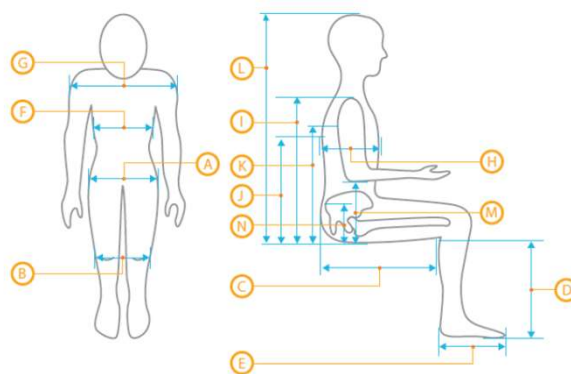
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The assessment



- Patient demographics
- Age
- Diagnosis/prognosis
- Co-morbidities
- Medications
- Special needs
- Surgical history/plans



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The assessment

- Types of terrain – **Adventure**
- Performance requirements – **Travel**
- Functional skills – **Social**
- Occupational activities – **Work**
- Home environment – **Family**
- Activities – **Recreation**

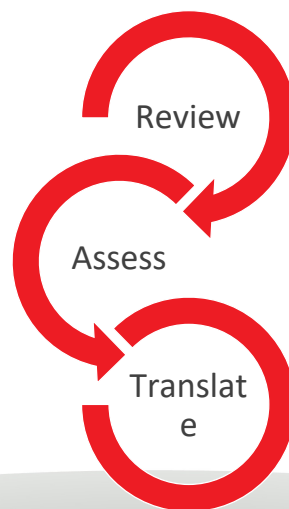


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The assessment – mat evaluation



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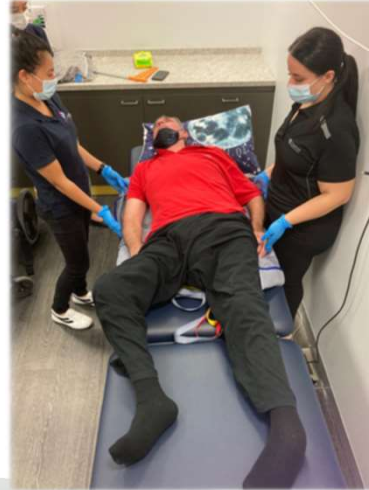
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Seating - The assessment



- Physical status
- Strength, neuromotor, tone
- Sensation/skin integrity
- Cognition/behaviour
- Integrate, sequence, retain info
- Judgement
- Visual limitations

WORK – how you do the work you need to make a living, manage your everyday life, or give back as a productive contributor to your employer and community.



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Work - Seating, posture, pressure care

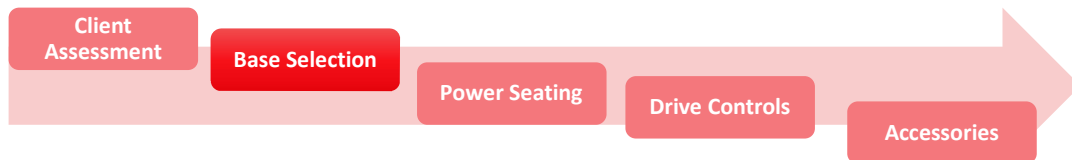


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The assessment process



Creating Successful Outcomes

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Travel – Drive wheel considerations



Affect on maneuverability:

- Center of rotation
- Human driver to power base interface
- Terrain
- Type of input device used



TRAVEL – how you go beyond your local environment to see new places, meet new people, or simply get on with other things you need and want to do in life.

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Drive wheel configurations



FWD



MWD



RWD



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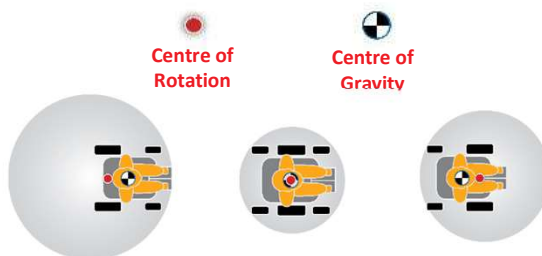
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Centre of rotation



- Point of wheelchair base around which the rest of the wheelchair rotates when turning
- Affects maneuverability
- Driver to power base interface



Why is this important to understand?

Koontz in 2010 found that maneuverability was more based on location of drive wheel than the physical wheelbase.

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Base types

- Front wheel drive
- Rear wheel drive
- Mid wheel drive
- All Terrain 4x4

Travel & adventure



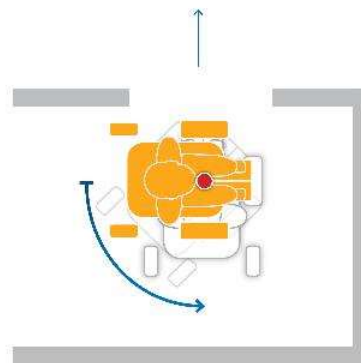
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Front wheel drive: Centre of rotation



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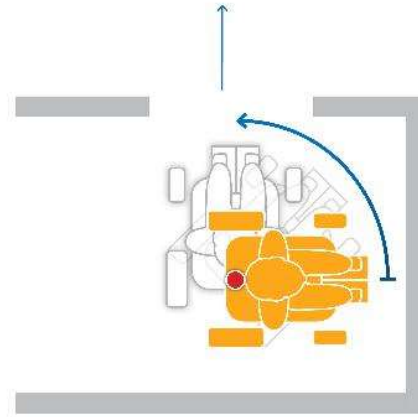
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Rear wheel drive: centre of rotation

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Frontier v4 front & rear wheel examples

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Frontier
V4®

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Front wheel drive



Potential Pros

- Good climbing ability
- Able to clear obstacles
- Can position lower limbs at tighter angles
- Able to get closer to work surfaces for functional activities

Considerations

- Poor control at higher speed
- Poor directional control
- Poorer control with non-proportional inputs



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Rear wheel drive



Potential Pros

- Performs well at high speed
- Good stability
- Intuitive to drive
- Good climbing ability
- Good with non-proportional inputs (Switched input systems)

Considerations

- Biggest footprint
- Largest turning circle
- Reduced downhill traction



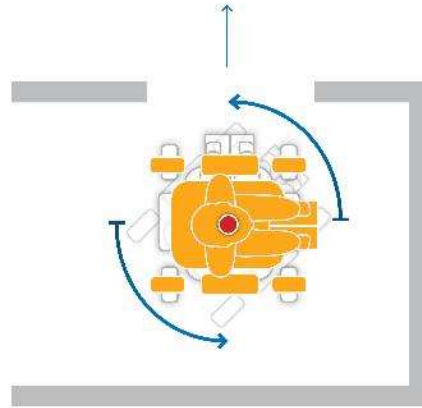
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Mid-wheel drive: centre of rotation

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Environment - MWD drive examples

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Mid-wheel drive Pros

- All round performance both for indoors and outdoors
- Good stability
- Intuitive to drive
- Smaller turning radius
- Smaller footprint
- What's most important most of the time

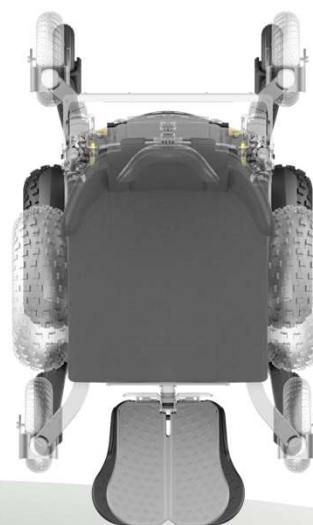


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Travel - Mid-wheel drive considerations

- Requires dynamic stabilizer wheels
- Dynamic stabilizer wheels add length
- Does this allow the client to travel varying environments
- What's most important most of the time (e.g. drive wheel choice)



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Adventure - Where Do You Want to Go Today?



Drive wheel considerations

14" Urban wheel



14" Crossover wheel



14" Off-road wheel



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Drive-ability - suspension



Effects on suspension:

- Maximise user control
 - Over uneven terrain
 - Even with poor motor control/spasticity
 - With weaker upper limbs
- Enable clients with poorer control to be an independent, safe driver on varying terrain
- Assists with protecting posture
- Pain management
- Prevents sliding in seat

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All terrain wheel base



- Robust outdoor wheelbase able to tackle rugged terrains
- For people who spend a lot of their time outdoors
- Large turning circle
- Reduced ability to negotiate tighter indoor environments
- Range may be reduced by number of motors



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The assessment



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Power seating - goals

Promote:

- Function
- Comfort
- Promote independence

Protect:

- Skin integrity
- Physiological function
- Appropriate postures

Facilitate:

Adventure, travel, social, work, family, recreation

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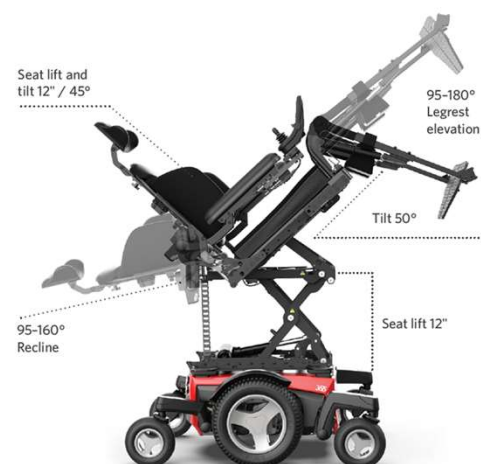
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Travel - Power Tilt Systems

Consider:

- Can they drive in tilt?
 - At what speed?
 - Is this sufficient?
- Will access to input device be affected
- Seat to floor height

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Considerations: Power Tilt

Advantages

- Pressure relief
- Increase sitting tolerance
- Improve postural stability
- Improve head control
- Improve muscle tone/spasticity
- Repositioning
- Access to terrain

Considerations

- Loss of visual orientation
- Decrease social interaction
- Inaccessibility to tables, desks



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Considerations: Seat Lift

- Transfers
- Reach
- Reduce orthopedic effects of lower position
- ADL
- Carer access (sling application for transfers)



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Social, work, family - Seat lift application

- Meal prep and home independence
- Gardening
- Social inclusion – at peer level
- Inclusion & interaction – education and learning
- Family interactions – Social & mental well being
- Activities of daily living – home & work

SOCIAL – how you engage with the people around you and play an active part as valued member of your community and society.

FAMILY – how you play your part as a child, parent, grandparent, sibling, or member of your broader family.



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Work - Seat Lift

Considerations:

- Seat to floor height
- Overall height and access to vehicle
- Driving capability in lift (terrain)
- Speed in lift
- Height of lift



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Power Recline



Recline systems provide a change in seat to back angle orientation whilst maintaining a constant seat angle compared with the ground.

It is often used in conjunction with elevating leg rests.



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Clinical Considerations: Power Recline



Advantages

- Pressure relief and distribution
- Decrease fatigue
- Increase comfort/sitting tolerance
- Bladder management
- Muscle tone management
- Supine transfers

Considerations

- May cause sliding resulting in the body/pelvis moving forward and out of position
- Affect driving if the drive control is attached to the wheelchair frame, i.e.: head array or chin control
- May cause shearing

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work, Travel - Power Elevating LegRests



- PELR's allow individuals to change the angle of orientation of the legs relative to the seat, extending or flexing the knee
- Some legrests articulate (lengthen) whilst also extending the knee to maintain foot position on the footplate



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Considerations: Power ELRs



Advantages

- Lower extremity swelling/edema (when combined with tilt)
- Repositioning (especially when used with power tilt and recline)

Considerations

- Must have adequate hamstring length

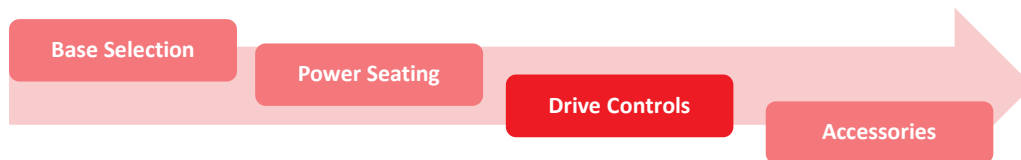


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THE ASSESSMENT



Making the RIGHT choices...

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Evaluation for Drive Control



Where and what is the best drive control?

- Adequate strength, control, etc. to use a joystick? (Handle options)
- Mounting location
- Special joystick handle
- Programming
- Does the client have a progressive condition?
- How will client manage power seating?
- Thru joystick
- Remote access



Are there other features client would like to control with their wheelchair?

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Assess for today and tomorrow

- Expandable software
- Assignable buttons
- Easily accessible buttons
- Simple to advanced joystick options
- Latched seating

FAMILY – how you play your part as a child, parent, grandparent, sibling, or member of your broader family.

RECREATION – how you like to spend your spare time doing the activities you most enjoy.



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Increasing Use of Seat Functions

- Access to controls
- Make it easy
- Switch box
- Thru joystick control
- IR and Bluetooth
- Programming to improve drive function
- Ability to transition to specialty inputs



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THE ASSESSMENT



Making the **RIGHT** choices...

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Work, family recreation - lifestyle Accessories



How do the accessories we chose allow us to engage in work, family and recreational activities?

- Luggage racks
- Bag hooks
- Arm rest storage
- Tray tables
- Oxygen and vent carrier
- Accessory charger
- RAM mounts
- Camera holder
- Fishing rod holder



RECREATION – how you like to spend your spare time doing the activities you most enjoy.

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adventure – because the world's not flat

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Case study - xabian

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- Xabian has an undiagnosed movement disorder resulting in severe global dystonia, which significantly limits his activities and participation in all areas of life
- Limited use of upper limbs and compensates using feet for play and activities
- No limits regarding joint range and prefers 90° upright posture
- Xabian is very bright and wants to be able to engage more at school and increase participation both in the classroom and outdoors with family and friends
- Issues with arms getting caught in areas of the chair causing pain, stress and anxiety



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Case study - xabian

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Case study

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Case study



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THANK You – Any Questions?



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