A video will (hopefully) play for the 2 minutes prior to the beginning of this presentation ….

‘On time’ Mobility

Mobility (noun)

məʊˈbɪləti/

‘the ability to move or be moved freely and easily’

Scott Langmead

Current Role: Clinical Lead - Posture and Mobility

AbilityWA

Clinical Advisor – Ability TECH

"mobility is an inherent characteristic of being human" (Kangas, 1997)

Learning Objectives

- Today we will review the considerations for use of powered and some non powered mobility devices as an assistive technology intervention, within an occupational therapy context.

1. Review the What, When, Why, How and Who of powered mobility.
2. To consider (powered mobility) prescription and considerations for children using current frames of reference.
3. To apply the basic occupational therapy process, task analysis and relevant frameworks to equipment consideration and selection.
4. Identify basic components of (powered) mobility devices, assessment, prescription and training, which consider the function and development of children.

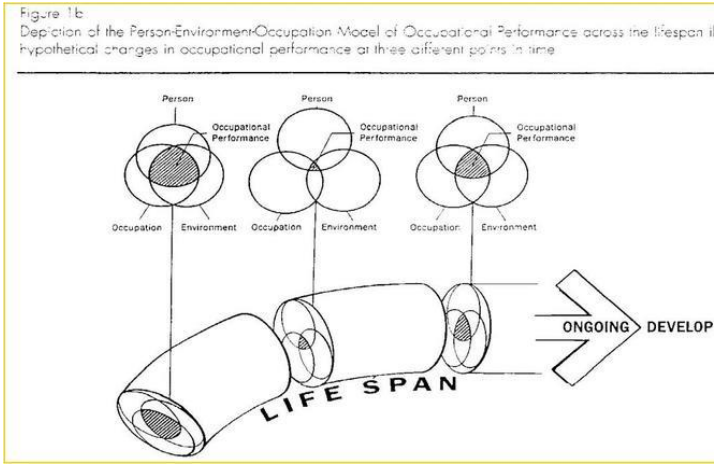
Ability WA

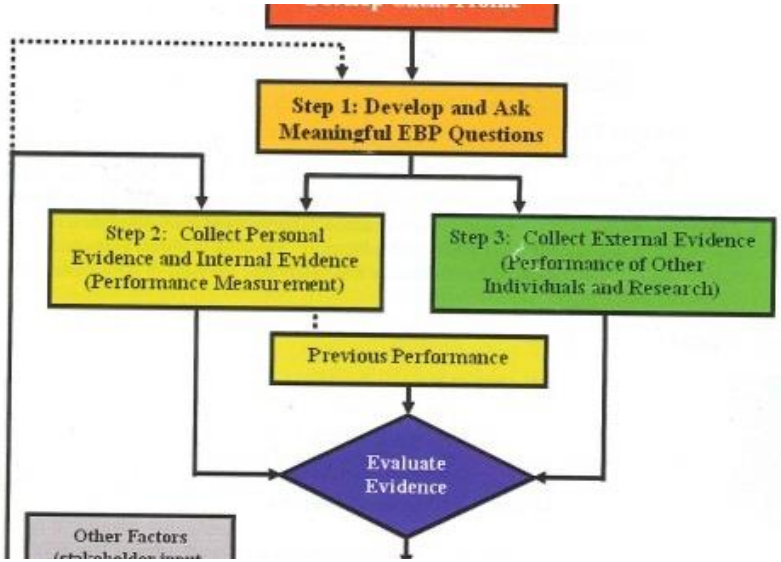
What's your experience of (powered) mobility devices?

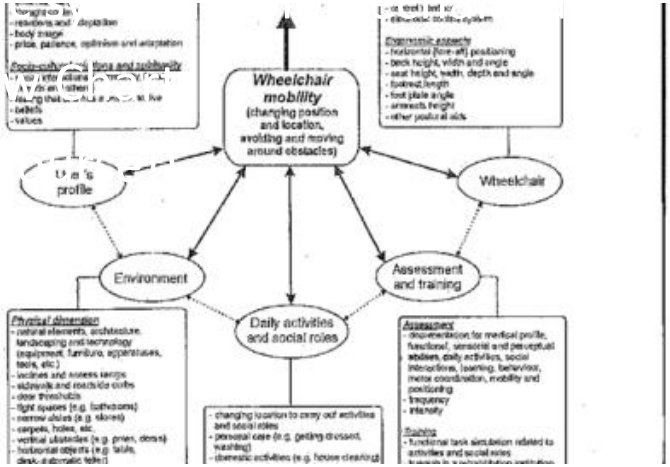
- How many of us here this evening access mobility based AT as part of our practice? Or want to?
- Driven a powered device as an attendant?
- Tried a power assist system? Tried to get one into a boot?
- Crashed a scooter or PMD?

How can we frame our intervention?

Frames of reference and theory







(Routhier, et al, 2009)

MPT: Matching Person to Technology

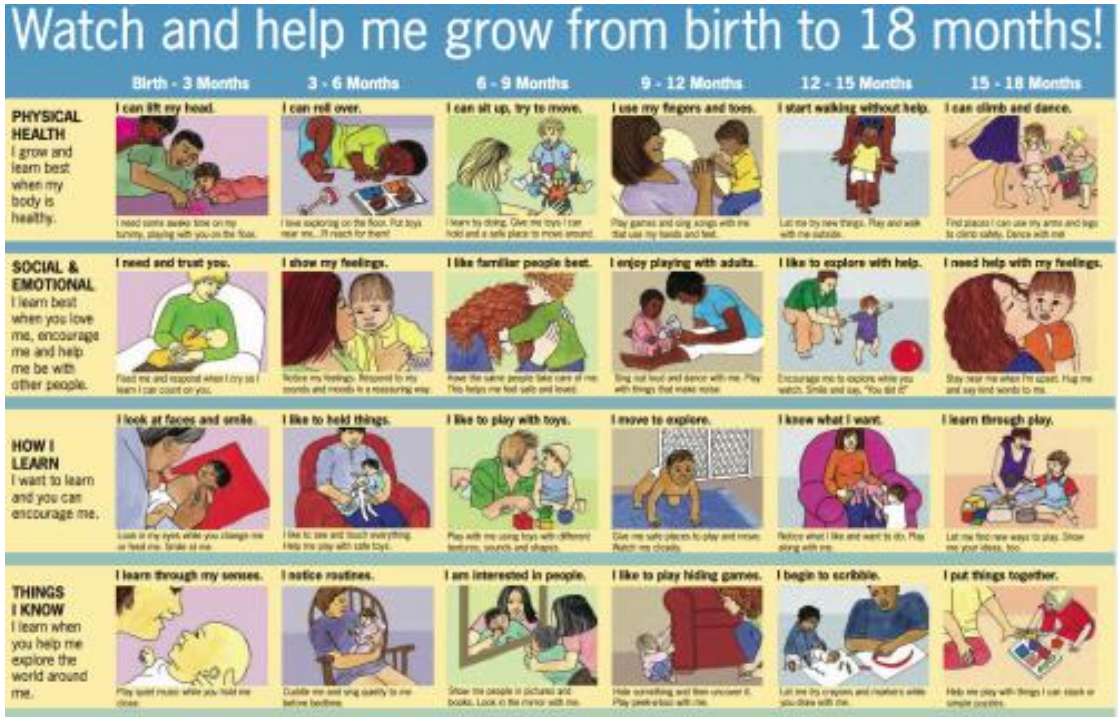
"When matching person and technology, you become an investigator, a detective. You find out what the different alternatives are within the constraints".

(From Living in the State of Stuck: How Technology Impacts the Lives of People with Disabilities)

Focusing on the Person, Milieu, and Technology

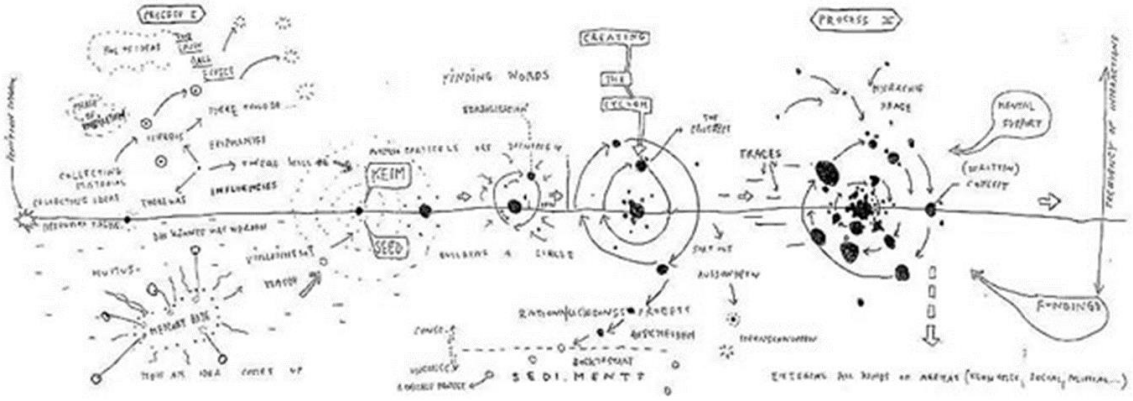
(Scherer, 2007)

Typical development



(Image http://www.achildwithneeds)om/)

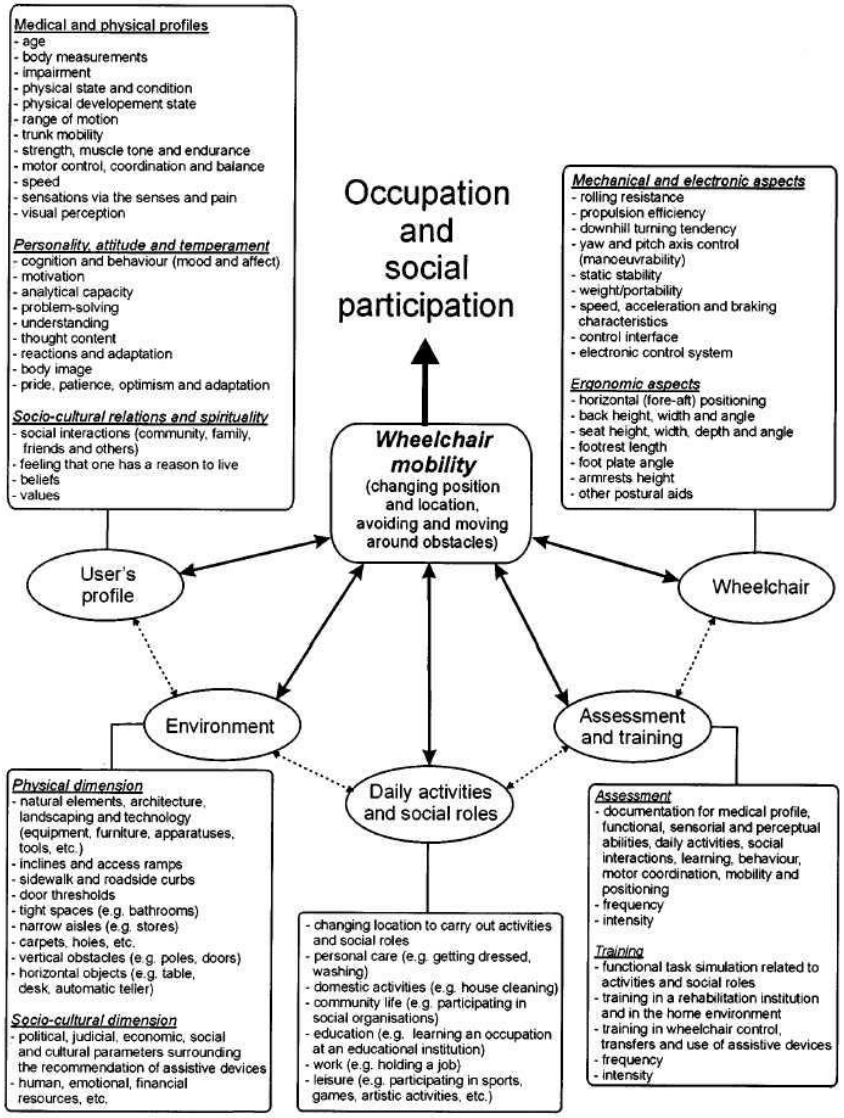
Lifespan Perspective



Bottos FCS for Mobility Independence in children with CP

Prognosis for Independent Mobility	Rehab Concerns	Intervention Strategies
Dependent on caregivers	• Symbiotic relationship • Deformity	• Assistive devices and equipment • Variety of caregivers • Normal life rhythm • Prevent deformities
Independence achieved through powered mobility	• Functional mobility • Functional sitting, transfers, standing • Deformity	• PT to develop balance, prevent deformities • Assistive devices • Early provision of powered mobility
Mixed Independence (walking and wheeled mobility, manual and powered)	• Limited mobility • Physiological burnout • Deformity	• PT to age 8 for walking • Walking aids and orthosis • Possible ortho surgery • Wheeled devices, possibly powered • PT to prevent deformities
Independent walking	• Pain,possibly limiting function in adulthood	• Periodic PT in adulthood for balance and gait, monitor Musculoskeletal status/deformity • Assistive devices over ages 40-45

(Bottos ,M Bolcati, C Sciuto L, Gericke, C Vianello A ,2001)



Relational model of wheelchair mobility

Relational Model of Wheelchair Prescription

Main Goal: **Occupation and social participation**

facilitated by;

Wheelchair mobility

Which is impacted by;

1. **The User profile**
2. **Environment**
3. **Daily Activities and social roles**
4. **Assessment and training**
5. **Wheelchair/ mobility device**

Learn from the past, improve the future

“If any prescription is exactly the same”…….

Predictive Assessment

- Example GMFCS, GMFCS curves.
- Conditions where function deteriorate
- Efficient mobility – design of seating system and mobility base.

Reality of Walking (Cerebral Palsy)

Never achieved by some

Loss or deterioration in many Teenage years: extraordinary energy cost

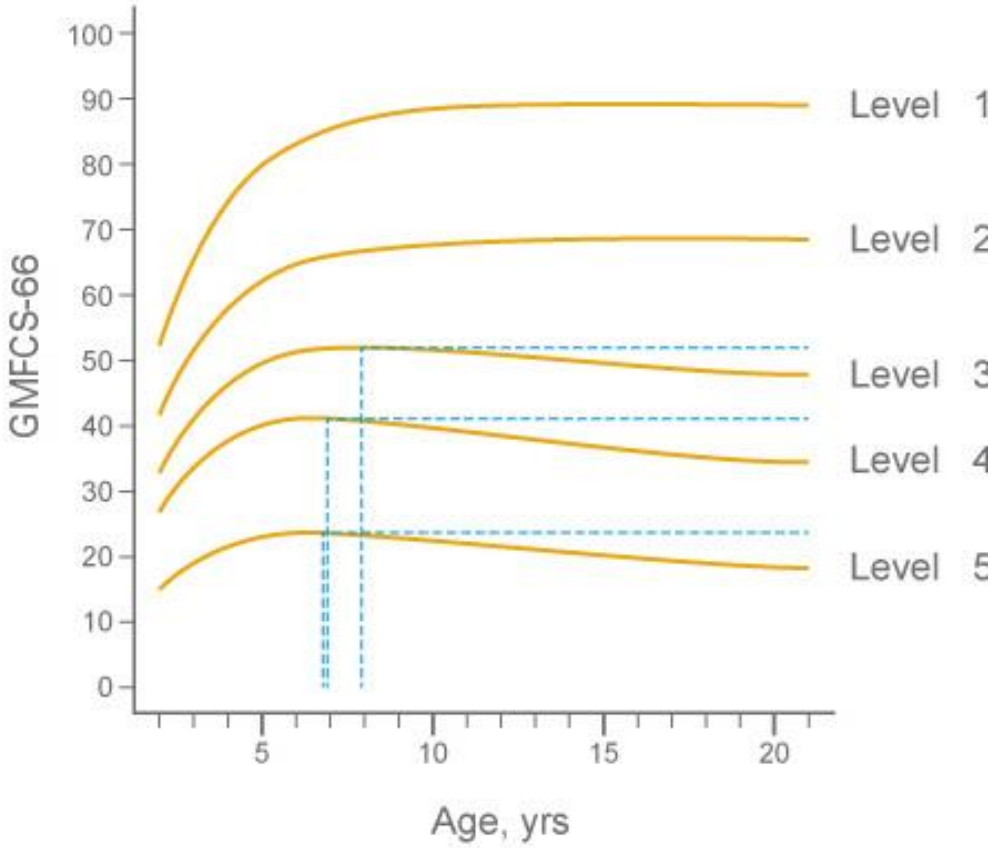
Mid-20s: physiological burn-out syndrome

Mid-40s: painful joint deterioration

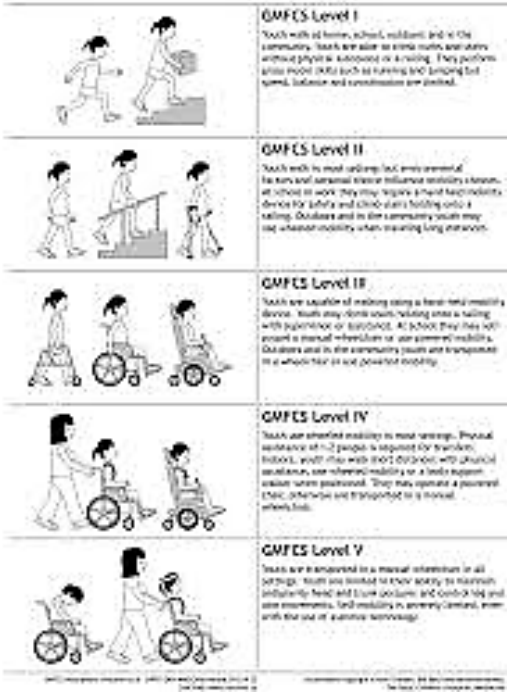
(Source: http://www.globalhelp.org/publications/books/help_effectivemobility.pdf)

Predictive analysis

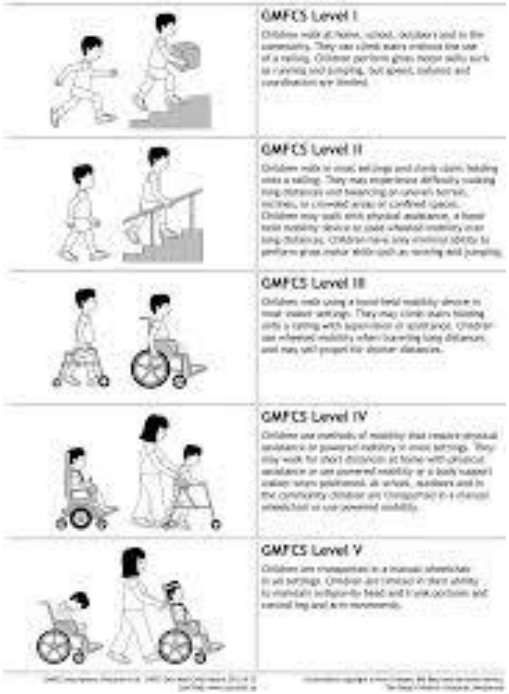
GMFCS



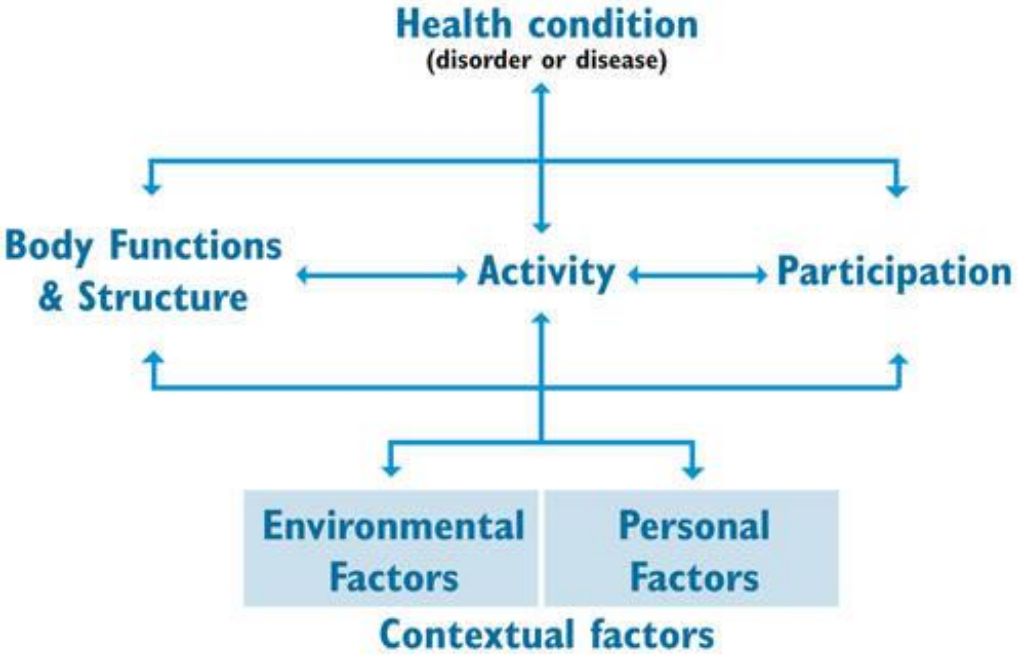
B GMFCS E & R between 12th and 18th birthday: Descriptors and illustrations



A GMFCS E & R between 6th and 12th birthday: Descriptors and illustrations



GMFCS & FMS: Mobility considered


Health condition
(disorder or disease)
Body Functions
& Structure
Activity
Participation
Environmental
Factors
Personal
Factors
Contextual factors

What model?

The F Words

The ICF Framework[1] and the F-Words[2]

Body Structure and Function

Everyone needs to stay fit and healthy both physically and mentally. Help me find ways to keep fit.

Fitness

Activity

I might do things differently but I CAN do them. How I do it is not important. Please let me try!

Functioning

Participation

Having friends is important. Please give me opportunities to make friends.

Friends

Environmental Factors

My family knows me best and I trust them. Listen to them. Talk to them. Hear them. Respect them.

Family

Personal Factors

Life is about having fun. Please help me do the activities that I find the most fun.

Fun

Future

I am growing up every day, so please find ways for me to participate and be included in my community.

For more information visit the F-words Knowledge Hub:
www.canchild.ca/f-words

CanChild

1) World Health Organization. (2001) *International Classification of Functioning, Disability and Health (ICF)*
2) Rosenbaum P & Gorter JW. (2012). The 'F-words' in childhood disability: I swear this is how we should think! *Child Care Health Dev*; 38.

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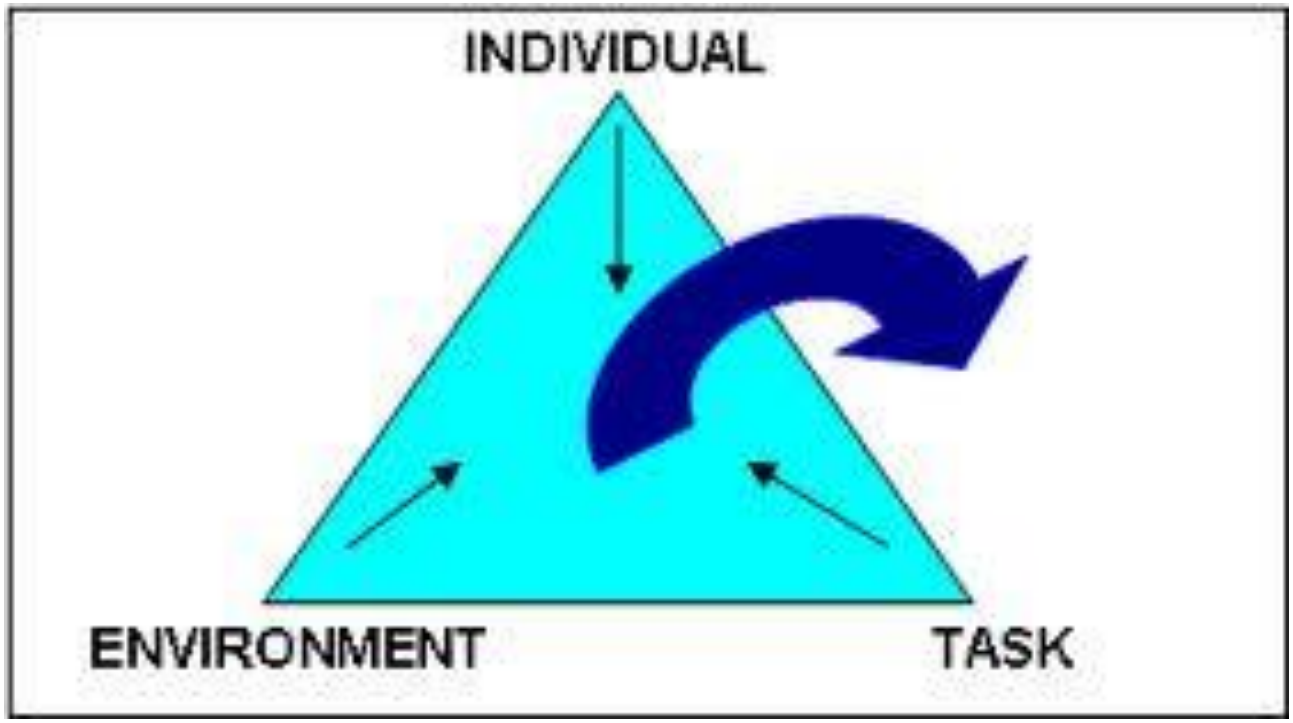
Dynamic Systems Theory



Who: Benefits from powered mobility*?

Children Who	Representative Diagnosis
Will never walk	Severe CP with spastic quadriplegia or athetosis, spinal muscular atrophy types 1 and 2, multiple limb deficiency
Have inefficient mobility	Ataxia, spastic diplegia and milder forms of quadriplegia and athetoid CP, myelomeningeocele,and juvenile RA
Will eventually ambulate	Spastic diplegia CP or arthrogriposis in which eventual surgical corrections may make walking possible; osetogenesis inperfecta requiring protection during childhood
Have lost mobility	Neurological sequelae from trauma and infectious disease, progressive disorders such as Duchene muscular dystrophy

Hayes Four Part Classification*

(Ref: Hayes, R 1987)

The Red Flags

- Falling (Fractures)
- Friends (keeping up in the playground)
- Family (lifestyle and coping)
- Fatigue (wheelchair as a Taxi)
- Freedom (behavioural/learning effects)

Cerebral Palsy Specific data

- Wheelchair use- Sweden CP population- 29% used a wheelchair indoors, 41% outdoors.
- Ontario study- only 24% of children with GMFCS level 4/5 CP between 4 and 12 years of age used powered mobility (Palisano et al., 2003)
- 86% pushed using MWC
- PM- 86% independent mobility
- GMFCS level 4/5 at risk of…….
- Diagnosis specific info (base on evidence)

Early 'On Time' Powered Mobility

- Children aged 24 months and younger (RESNA, 2009)
- Self produced mobility has been shown to develop a child's thinking and social skills (Hansen, 2008).
- Self produced mobility has been linked to the development of key developmental skills and the development of coping skills.
- Powered mobility increases the child's interaction with objects and people around them. (Durkin, 2005))

Mobility conversations

(with counseling 101)

- Early Intervention;

  Pram = wham
- Sensitive use of counselling vs real world conversations
- Walking will always be the ‘ultimate’ (typical development) goal
- Planning transport options /safe & sustainable manual handling
- Conversations prior to important life transitions
- Long term, planned and thoughtful intervention, includes good handover to maintain continuity
- Self Direction- Considering and identifying “a good life” & “hopes and dreams” within a ‘reasonable and necessary’ framework [NDIS]

- Development;
- Social emotional
- Cognitive
- Spatial perceptual
- Visual tracking
- Increased alertness
- Increased understanding of cause and effect
- Increased arm use
- Reduce learned helplessness
- Efficiency
- Participation! Etc….

* Cost
* Transport decisions
* Environmental issues
* Stigma?

Benefits and…..not benefits

Mid way break – Questions/ comments

What; options and complexities in mobility decision making

Compromise/folding chairs

Series 4, Pride R4, Series 2 Joy, I xpress, To Do, Alber E – fix

Efficient manual mobility

Rear Wheel Drive (RWD)

Rear Wheel drive

Positives

- Easier to drive at high speeds
- Easier to define boundaries
- Can do wheelies?

Negatives

- Larger turning radius
- More difficult to turn on carpet/ grass
- May get tippy backwards
- Getting rarer

Mid Wheel Drive (MWD)

Mid wheel drive

Positives

- Shorter turning radius
- Easier to turn on grass/ carpets
- Better for rough terrain (if castors do not get stuck)

Negatives

- More unstable at high speeds
- More chair is out of sight when turning
- Small front or rear castors

Front Wheel Drive (FWD)

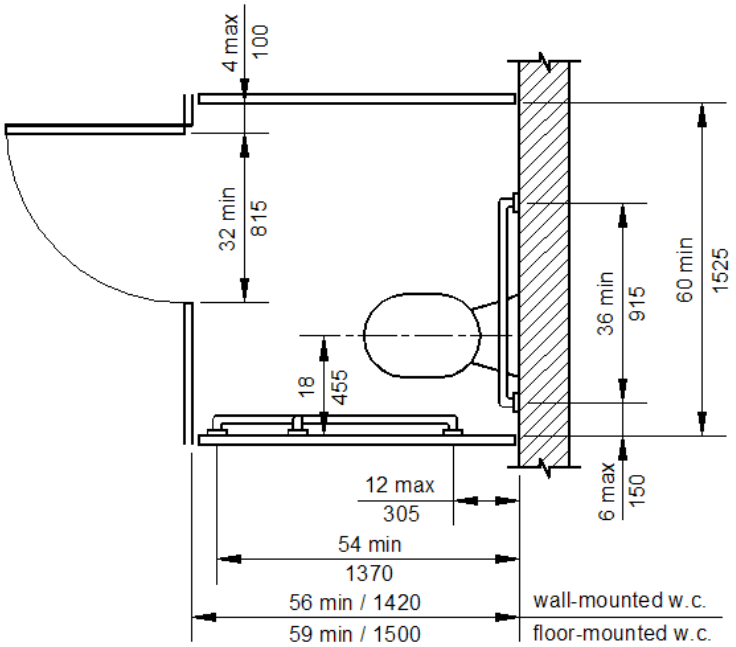
Front wheel drive

Positives

- Easier to approach tables
- Least likely to get stuck
- Very easy to turn
- Good for standing transfers

Negatives

- Difficult to drive straight
- Bump into things behind when turning



Illustrating drive formats

Seat Functions

Power and control……..

Controls

Complex Displays

S

R Net Omni, Q Logic 2 Enhanced display, mounted off the armrest

- For additional and alternate inputs, Factor in deterioration;

Switches, mini, midi, micro joystick, chin control

- Bluetooth and infra red – ECU, Phone

Scanning, mouse, I-pad, Android .

- Progressively more functions in hand controls now.

Options…….

Access

Single or two switch scanning

Options

Options

Options

electronics

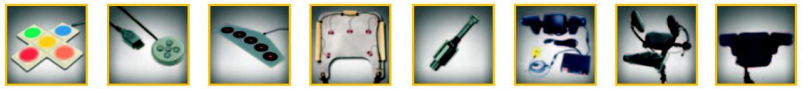
Non-Expandable

NE and NE+ | PG VR2 (4-key) | PG VR2 (6-key) | PG VR2 (9-key)

Expandable

Q-Logic EX Joystick | Q-Logic EX Joystick with Lights | Q-Logic EX Enhanced Display | Q-Logic EX Stand Alone Joystick/ EX Attendant Joystick

Multi-Switch Systems

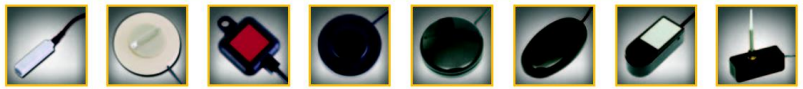


TASH Star Board | TASH Penta Switch | TASH Waferboard | Switch-It Lap Tray | TASH Mini Joystick with Push | ASL 3-Switch Head Array | 3-Switch Stealth Ultra Head Array | Switch-It Head Array (3, 4 or 5 switch)

Proportional Drive Controls

ASL Micro Extremity Control | Switch-It Proportional Joystick | Finger Steering | HMC Mini Joystick | Stealth Mushroom Joystick | ASL Rim Control | Switch-It Touch Pad

Single Switch



TASH Tip Switch | TASH Pillow Switch | TASH Trigger Switch | Switch-It Microtouch | Buddy Button | Egg Switch | MicroLite Switch | Switch-It Uniwobble Switch

Sip-N-Puff Options

Therafin Whisper-Lite Sip-N-Puff Hardware | ASL Sip-N-Puff Head Array | Switch-It Sip-N-Puff with Opti-Stop

Additional Options

ASL Remote Stop Switch | Switch-It Remote Stop Switch | TASH Relax II Infrared Interface Module | Joystick Handles

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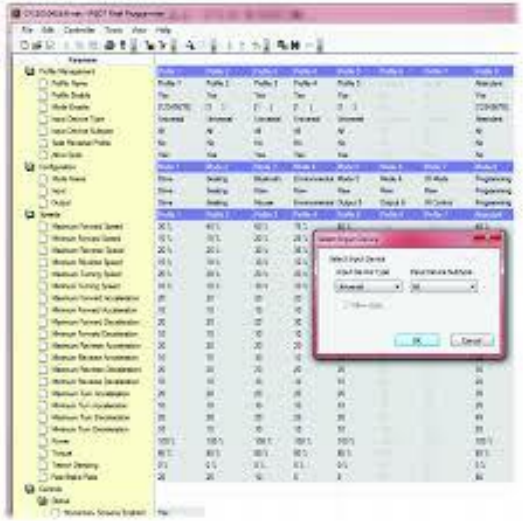
Programming



HHP (Hand Held Programmer)

Computer based

Assessment

- Seating review
- Performance components that may impact on device use
- Medical assessment
- Lifestyle assessment
- Risk Assessment
- Match it to the funding body e.g. NDIS/CAEP/Compensable

Apply: 1. Biomechanical, 2. Relational, 3. PEO/P,

4. Client centered approach 5.MOHO 6.Others?

Adult Assessment Model

- Pass/fail thinking- function snapshot
- Standardised assessment/ clinic oriented skills
- 3-7 day trial
- Directive ‘show me that you can do this’
- Independence and safety
- Rehabilitation?

- For a contrasting perspective look at Dr Durkin (Sweden)’s Drive to Learn research.

Child Assessment Model

- Understanding and supporting the context and priorities of the child
- Play based
- Child led (within Family Centered Practice)
- My exploration is more important than your walls!

'Your job is to keep me safe in the same way you would my peers'

- What skill development do I need to develop now that I might use later?
- Dynamic Systems Theory
- Development of Skills- Exploratory to Directed to Independent

Access to powered mobility

- Age appropriate supervision is a natural, and may be required for safety and to enhance learning
- Switch consistency is higher when utilising a power wheelchair as compared to switch toys – additional vestibular and visual information (Nilsson, Nyberg,1999)
- Training is usually required before a child is able to demonstrate readiness
- Almost always a good activity with benefits

http://findgreatstuffs.blogspot.com/2011/02/wii-powered-robot-chair-lets-infants.html

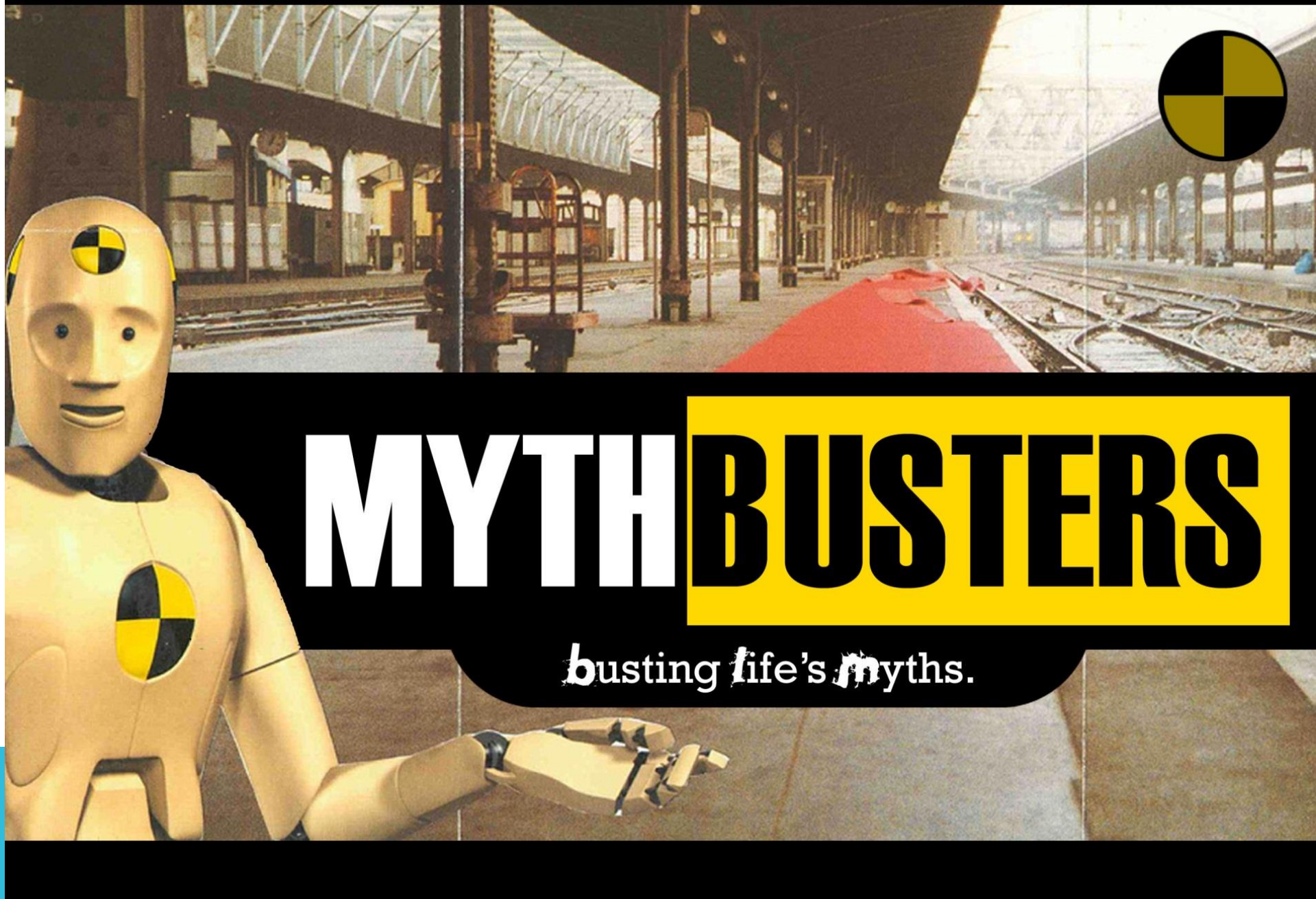
Introducing… Mater, Wizzybug, Stretto,Explorer Mini & Koala!

Introducing Wizzybug!

https://www.youtube.com/watch?v=V9bEmVHE3zs

Wizzybug – custom modification

designability
Bath Institute of Medical Engineering


MYTHBUSTERS
busting life's myths.

MythBusters

1. My child will regress in their motor skills due to use of powered mobility (Bottos et al 2001)
2. My child will become lazy
3. My child won't want to walk anymore
4. Children view the use of powered mobility negatively
5. Mobility and exercise are the same thing
6. IQ is a good determinant of a child's ability to operate a powered wheelchair.
7. Chronological age is the best indicator of ability to use a PMD

“I’m just not ready!”

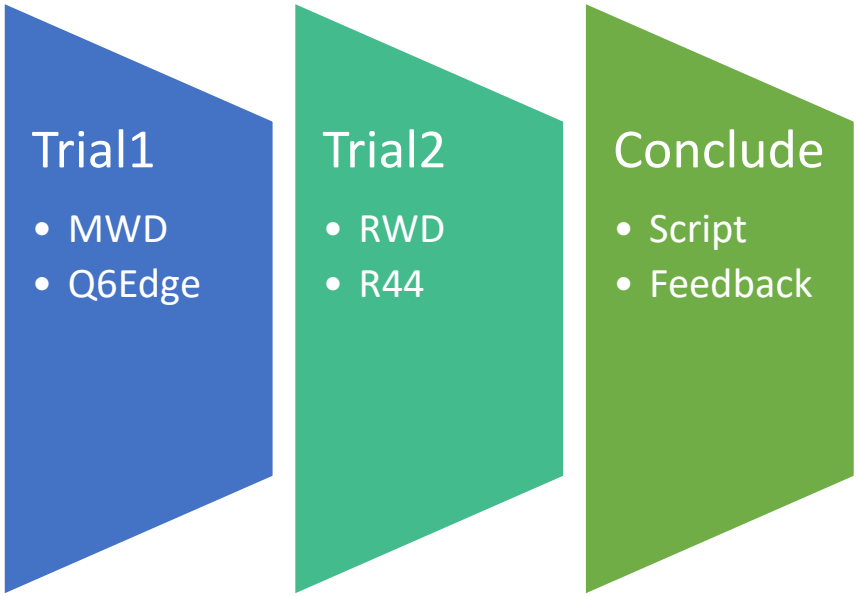
- The thought of a wheelchair is often harder than the reality.
- Avoid times of peak stress for families (?transitions)
- Opportunity in the natural environment
- Groups? Diads? Herd mentality
- Prolonging ambulation is important (parents value walking) Planning
- Emphasise +ves but acknowledge –ves

Trial

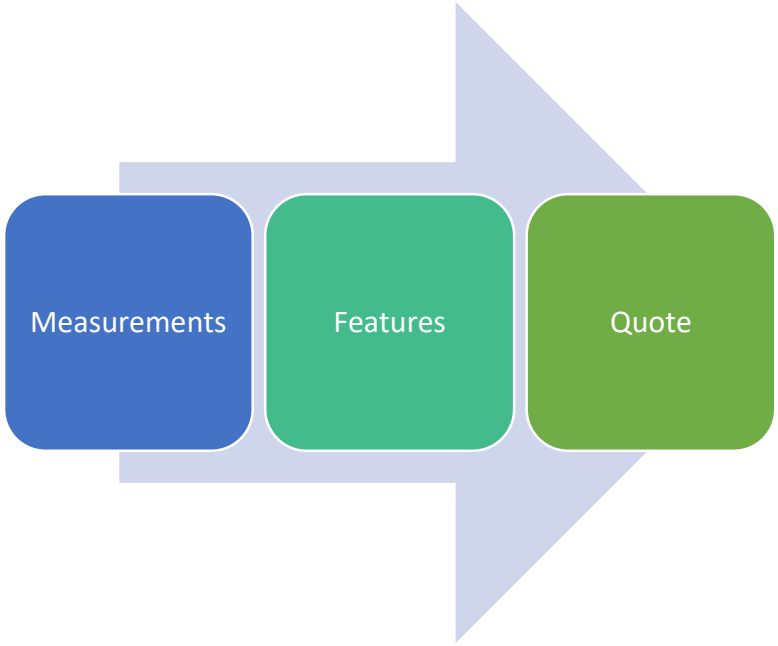
- Seating required for trial
- Essential features for trial
- Accessories required for trial
- Trial to fail

- Time: 7 days

- Collate trial feedback.
- 3 day call



Scripting the device



Tips

- Get the latest script form
- Measure twice, cut once!
- If you don’t know what it is ask the supplier
- Have your own clinical rational and what you can justify!
- Not confident – get assistance

Order and setup (retrial)

- Order the chair (6-8 weeks to arrive)

- Check that you got what you scripted
- Review your previous notes

- Coordinate if any seating needs to be fitted
- Adjust chair specifications to client

- Program specifically to client

- Fitting clinic – chair goes out on trial with client (Provide with a trial form)

- Return from trial appointment if required.
- Complete outcomes

Training/ Ax

(creativeuncut.com)

- Identify areas of training (if required)

Tools ;

- ALP (Durkin) Small incremental observations
- PIDA- Powered mobility Indoor Driving Assessment
- PICA- Powered mobility Community Driving Assessment

"Designed by Occupational Therapists and Drivers for use by Occupational Therapists, Drivers and Others"

(http://fhs.mcmaster.ca/powermobility/)

- PoMoDat (Unwin & Townsend) Structured functional review for reporting. Includes 'Moca' Cognitive Assessment component.

*Other assessments available WST etc. (clinic & 'real world' based)

- **Consider need for;**

1) Supervision

2) Programming of chair

3) 'Dignity of risk'

4)Safety

NDIS (Not a swear word but close)

What does the legislation say?	Task modification
Pricing/feature/function hierarchy	Task Achievement- Partial /Full
Value for money	Impact on supports (cost benefit)
Communication and timeframes	Advocacy and follow up

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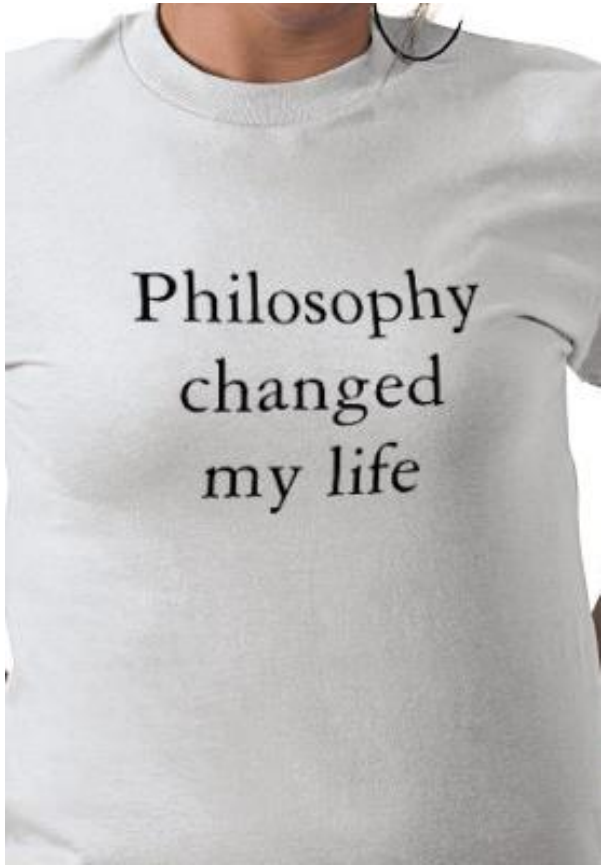


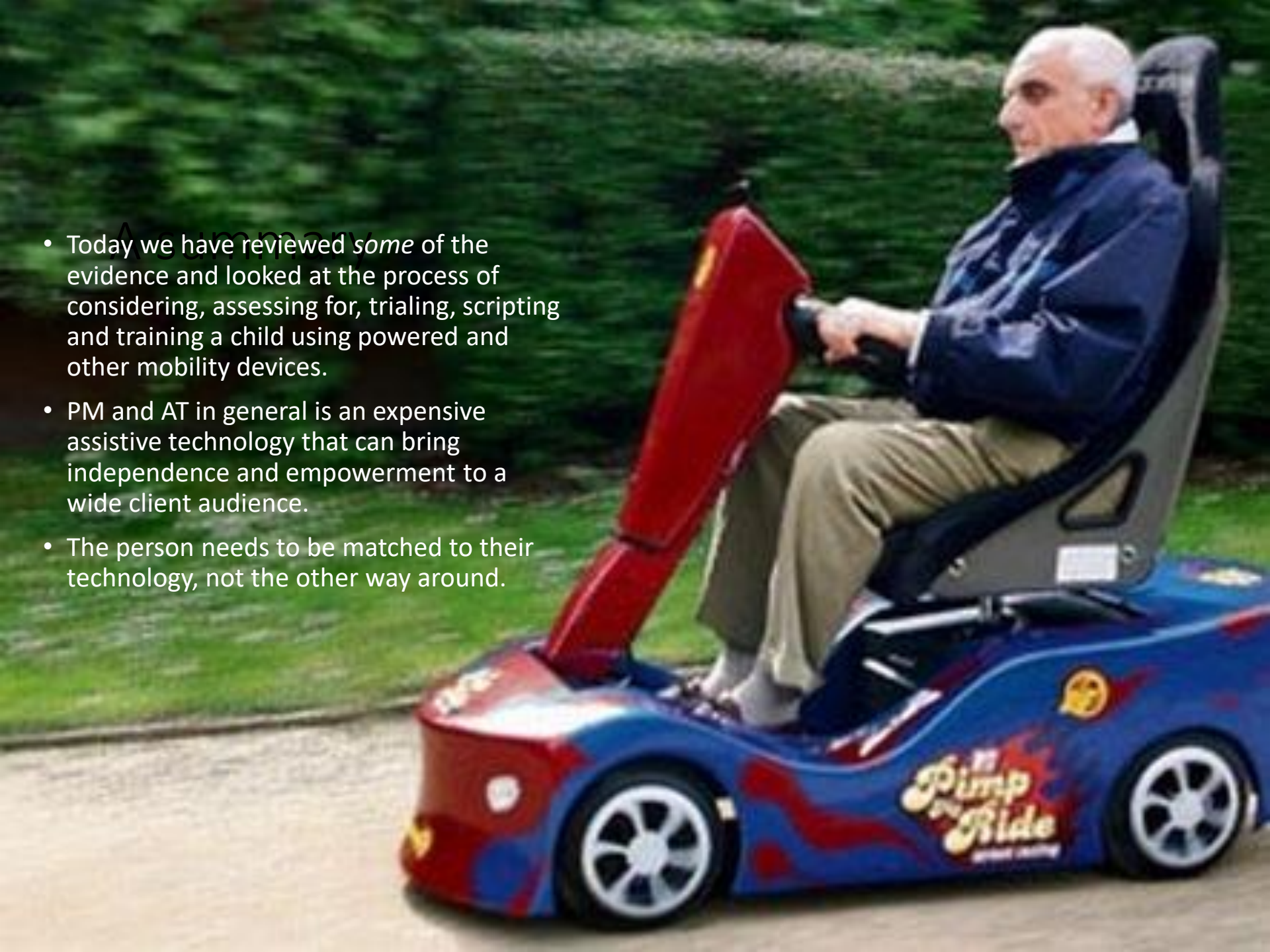
Powered Mobility: Philosophy

OTs can provide.

- Where mobility is developing or restricting, PM (powered mobility) can provide an interface.
- Powered mobility shall be equated to walking in its importance to provide equal access to participate.
- The use of powered mobility can be presented as a positive option throughout the lifespan.
- Powered mobility is a therapeutic tool in its own right.
- Powered mobility is not purely about ‘readiness’ or ‘eligibility’, but rather an opportunity
- Powered mobility shall not be considered a ‘last resort option’

Summary

- Today we have reviewed *some* of the evidence and looked at the process of considering, assessing for, trialing, scripting and training a child using powered and other mobility devices.
- PM and AT in general is an expensive assistive technology that can bring independence and empowerment to a wide client audience.
- The person needs to be matched to their technology, not the other way around.



Case Studies if time…….

Any questions?

Scott Langmead
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AbilityWA/ Ability TECH
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And remember……..

“mobility …is an inherent characteristic of being human” (Kangas, 1997)

Thank-you

CREDIT: LYNN JOHNSON, NATIONAL GEOGRAPHIC

Ability TECH

CUSTOMISED SOLUTIONS

Ability WA

AT Clinical Advisor Ability TECH

- Internal and external focus
- One off consults
- Quoting assistance
- Clinical problem solving
- Materials science and resource selection
- Product awareness
- Improving Ability TECH access

AssisTkids

Specialist Equipment Library

Short Term Hire of AT

- Mobility devices
- ADL bath and shower chairs
- Alternate seating
- Wizzybugs and powered mobility devices
- Varying levels of complexity of AT
- Loan/Hire may be waived as program is supported by Telethon.

Ability WA

New Starter programme

- Two year structured program for New graduates of therapists new to disability sector
- Relevant training, peer mentoring, shadowing appointments and communities of practice to gain skills and confidence to work in field of disability.

Assistive Technology Career Path

- Suits therapist minimum of 2 years into career
- Passion for Assistive Technology
- 3 Streams
    - Posture and mobility
    - Sleep and Positioning
    - Communication and Access and Technology

- Structured program facilitated by AT Lead
- Access to professional development, shadowing experienced therapists, peer mentoring and customer caseload in area of choice.

Tours – Ability TECH

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Achieve together

Think differently

Make things happen