



UNIVERSITY  
of  
OTAGO  
*Te Whare Wānanga o Ōtāgo*  
NEW ZEALAND

RTRU

Rehabilitation Teaching & Research Unit

# Experiences of dynamic, carbon-fibre orthotics on the health and wellbeing of people with post-polio syndrome

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# Background

## 2014 - Polio NZ Survey → orthotics as a major issue

- Dissatisfaction with shoes, orthotics, and services

## 2016 - Orthotics Users' Survey of Polio NZ Members

- 575 survey sent; 253 returned; 128 orthotic users identified
- **Experiences of problems with orthotics:** pain, difficulty fitting shoes, skin abrasion, appearance
- **Experience of services:** generally positive; most common problem was lack of coordination of services, some complaints about lack of discussion of options & potential problems.

# Challenges

- People with polio have idiosyncratic muscle impairments; no two alike (Farbu, 2010)
- Muscle/joint changes following polio are different than those after other types of neurological conditions (e.g. stroke or MS)
- Different types of solutions to optimize physical functioning required (Genêt et al., 2010; Portnoy & Schwartz, 2013)

# Traditional orthotics



- Mental and/or solid plastic
- Heavy/abrasive
- Tends to restrict movement
- Restricts movement in one direction
- Does not effect other movement (e.g. Foot inversion/eversion)
- Limited individualisation

# Dynamic braces

- Carbon fibre
- Lighter
- Permit/supports movement in multiple directions
- Individualised
- Proportedly improves mobility
- **Not currently funded by Ministry of Health**
- **Costs \$15,000 to \$50,000 per brace**



# Background

- The Duncan Foundation brings out Marmaduke Loke of Dynamic Solutions to NZ
- 10 people fitted with new dynamic braces in 2017-2019

## Question:

- Were these new braces successful?
- How do we know?
- What was required to be successful?
- How do decide what “success” is?
- How does it compare to past orthotic experiences?

# Methods

- Small number of people – so case study/qualitative research initially
- Ethics approval from University of Otago Human Ethics Committee
- Interviews conducted via videoconference
- Transcribed verbatim
- Analysed using qualitative descriptive analysis
- NVivo software to help manage the data

# Participants

- Currently, 8 people interviewed
- From range of regions (rural and urban)
- Mix of single leg and double leg; AFOs and KAFOs.
- More men than women



# Past experience of orthotics

- Mixed experiences
- Very dependent on nature and accessibility of DHB approved orthotics providers
- Some had a really helpful orthotist
- Some did their own adjustments

# Experience of assessment, casting & fitting

- More of an art than a science
- Earlier recipients less clear about what to expect & what they needed to do

# Experiences of learning to use the new brace

- Post-fitting support (physio, orthotic) mixed
- Some users modified their own braces to correct problems
- Extensive time and effort required to learn to use new brace
  - Commitment and determination
  - Daily stretches and exercises
  - Wearing the braces every day for increasing periods
  - “Training the brain” to trust the braces and stand and walk differently
  - Regular review and feedback needed that technique is correct

*‘I’ve had to train the brain since getting this new brace I’ve got to tell my brain not to rock on my foot... I’ve got to learn to take that weight on my toes’*

# Experiences of outcomes (mixed!)

## Positive experiences:

- Standing & walking longer (slopes and cambers more difficult)
- Greater functioning in standing (turning, moving)
- Talking to people eye-to-eye, having an impact of sense of self
- Reduction in pain
- Exercise helped regardless of the orthotic
- Those with positive experiences felt 10-50% of the way there...

# Experiences of outcomes (mixed)

## Challenges and negative experiences:

- Amount of training required far greater than expected
- Outcome not entirely what was expected
- Cost
- Finding shoes to fit still a challenge
- Moving between old orthotic and new dynamic brace difficult
- Some reported difficulty with driving; kneeling and getting down low

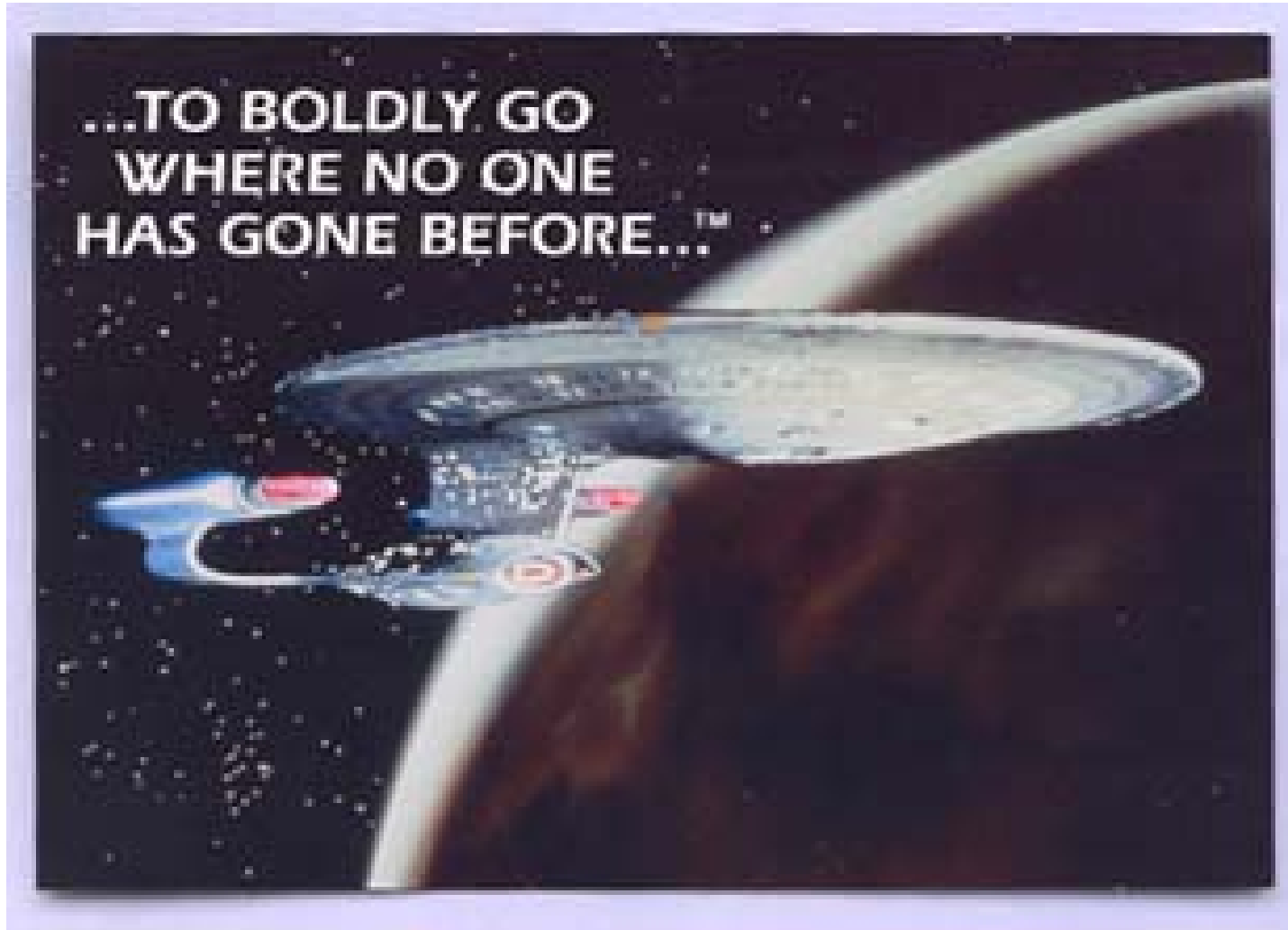
# Factors influence experiences

- Complexity of braces (number and natures of devices)
- Time & opportunity to do exercises & use the braces
- Elapsed time since being fitted
- Access to support (family, friends, professional input for fitting and training)

# Conclusions

- High uncertainty about likely outcomes when making decisions about dynamic braces
- High variability in how people adapt to the dynamic braces
- Successful dependent on time, resources & commitment to practice
- Significant improvements in standing & walking can be achieved after 2-3 years of daily exercise & practice,
- Adequate access to feedback & support is needed
- Cost is a barrier: \$15,000 & \$50,000
- Recent recipients more realistic about what is required to adapt and more optimistic about achieving a successful outcome over time

# Uncertainty and adventure





# Acknowledgements

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