

# **Participation in adapted dynamic cycling (ADC) - experiences of children and young people with cerebral palsy: a work in progress**

**APCP Conference London, 2012**

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# Research Team

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Pickering et al (2012a)



- ▶ Pedal Power, Cardiff  
([www.cardiffpedalpower.org](http://www.cardiffpedalpower.org))
- ▶ Cerebral Palsy
- ▶ Participation- ICF (WHO,2001)
- ▶ Literature around cerebral palsy, fitness and participation (Fowler et al, 2009; Fauconnier et al, 2009; Mihaylovat et al 2004)



# Ethics of research with children with a disability



United Nations Convention on the Rights of the  
Child (United Nations, 1989)

Rights of children to participate:

*Article 31:* ‘children have a right to relax, play and  
join in a wide range of activities’

*Article 23:* ‘children with a disability should have  
special care and support so they can lead full and  
independent lives’





# Objectives

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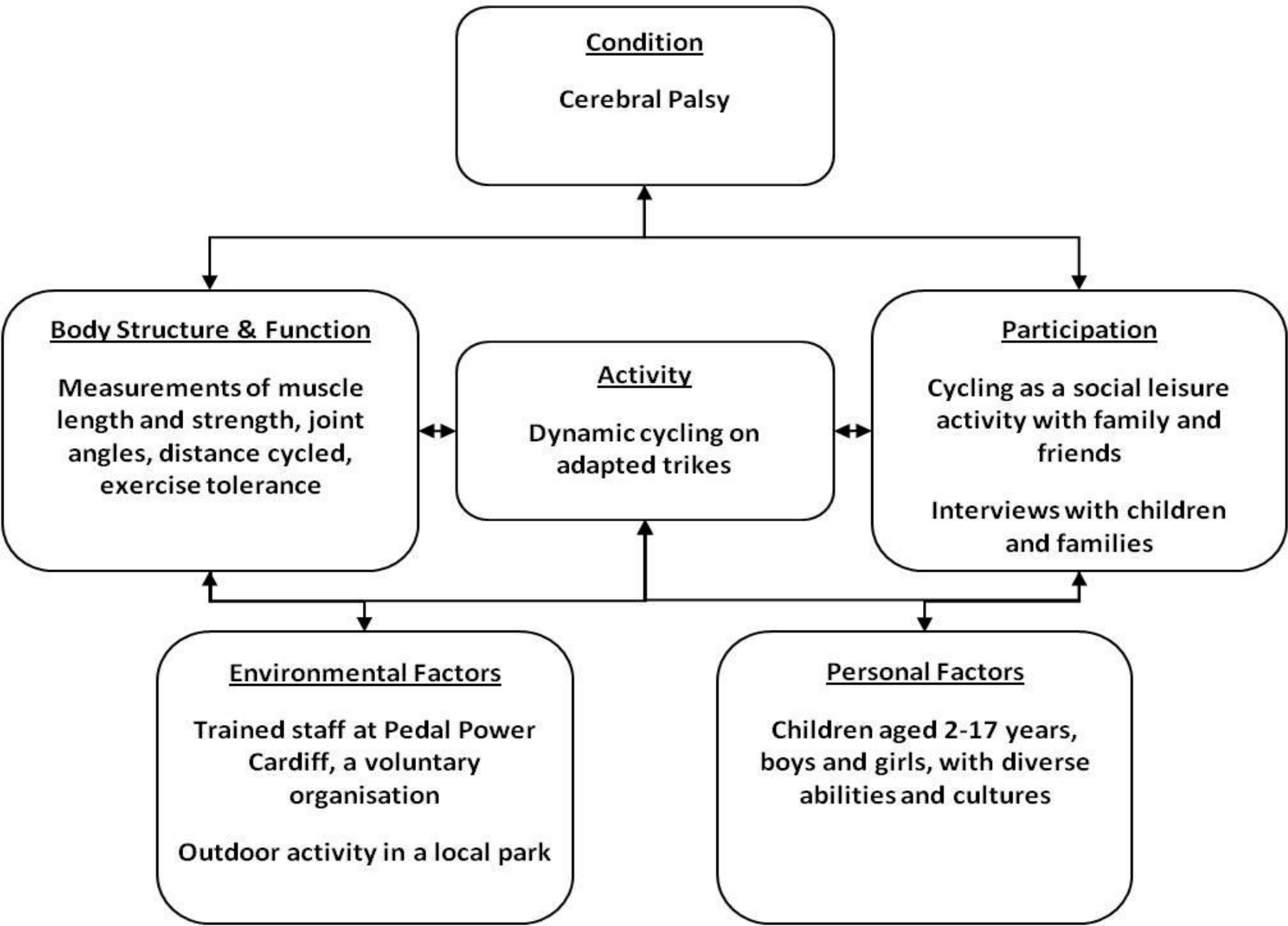
- ▶ To measure the effects of participation in Adapted Dynamic Cycling (ADC) at a voluntary organisation cycle hire facility

## Outcomes:

- ▶ Lower limb muscle strength, length and quality of life (QoL)
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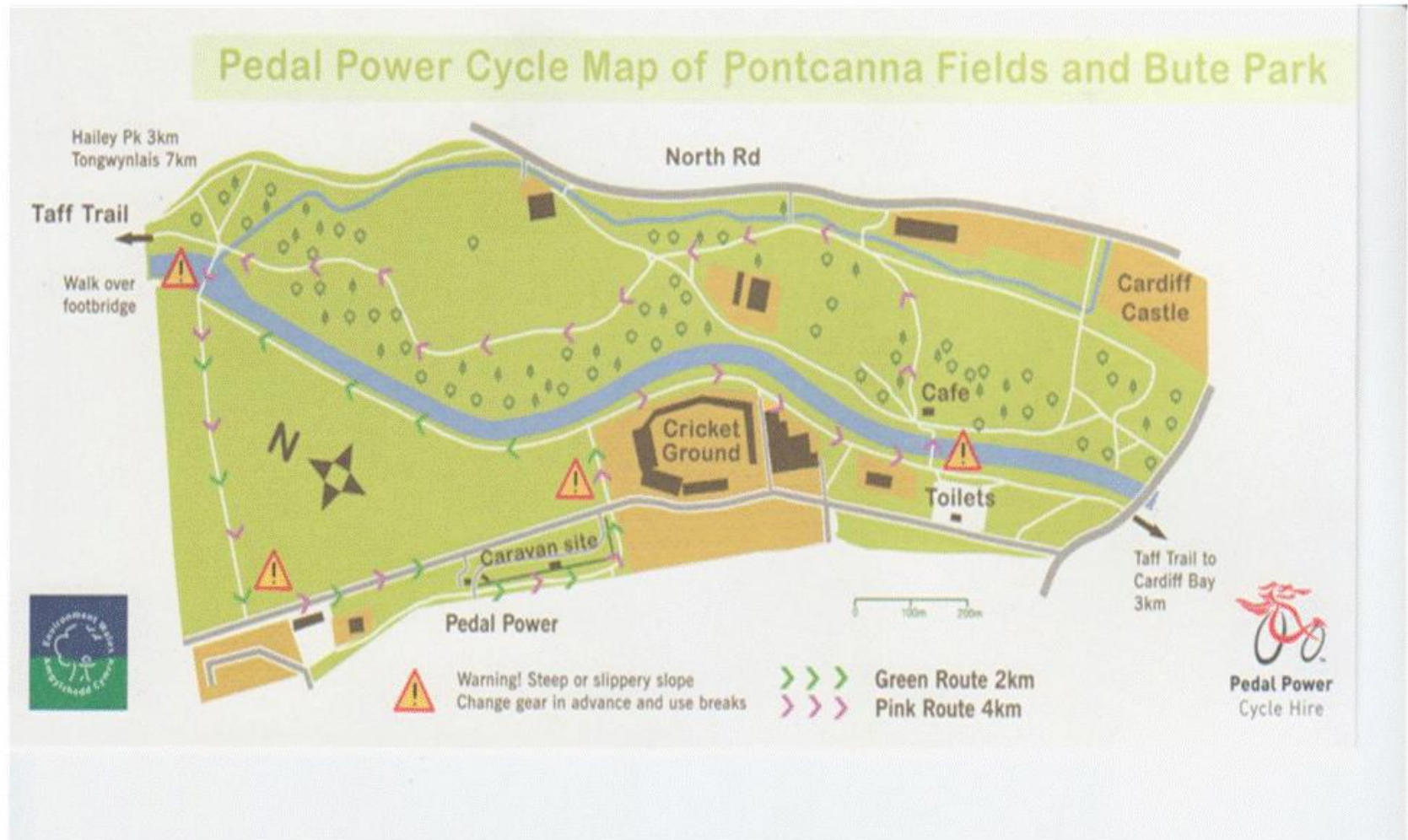


Figure 1: Pedal Power Pilot Research Project adapted from the domains of the World Health Organisation: International Classification of Functioning





# Picture of Cycle Path



# Physical Measurements







# Results- demographics

- n= 17: 7 males, 10 females
- Aged 2-17 years
- 8 Quadraplegia, 8 diplegia, 1 hemiplegia

<b>GMFCS</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	
Palisano et al (1997)	4	4	2	7	
<b>CLBSA</b> Pountney, et al 1999	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 7</b>
	3	2	2	1	9





# Results- inferential statistics

9 complete data sets: (4 boys & 5 girls):

Non-parametric: Wilcoxon Ranks Sign Test

Significant Quadriceps changes: (R)  $p=0.018$ ; (L)  $p=0.021$

Non-significant Hamstring changes: (R)  $p=0.065$ ; (L)  $p=0.069$

Means: 16 RQ (A), 13 RQ (B), 16 LQ(A), 14 LQ(B),  
16 RH(A), 13 RH(B), 16 LH(A), 13LH(B)

Means	Quadriceps (R)	Quadriceps (L)	Hamstrings (R)	Hamstrings (L)
Before	39.60 N	33.41 N	33.77 N	33.55 N
After	51.88 N	47.99 N	38.97 N	37.92 N

Significant (L) Quadriceps changes:  $p=0.05$

Non-significant (R) Quadriceps & Hamstring changes: (R) Q  $p= 0.38$

(R) H  $p=0.35$ ; (L) H  $p=0.43$



# Results- qualitative data

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- ▶ **Interviews** carried out at beginning and end of 6 cycle sessions by 2 researchers
  - ▶ 26 interviews and 8 **diaries** (some were lost or not completed)
  - ▶ 6 of the children used additional forms of communication than verbal; requiring adaptation of the questions and the use of pictures
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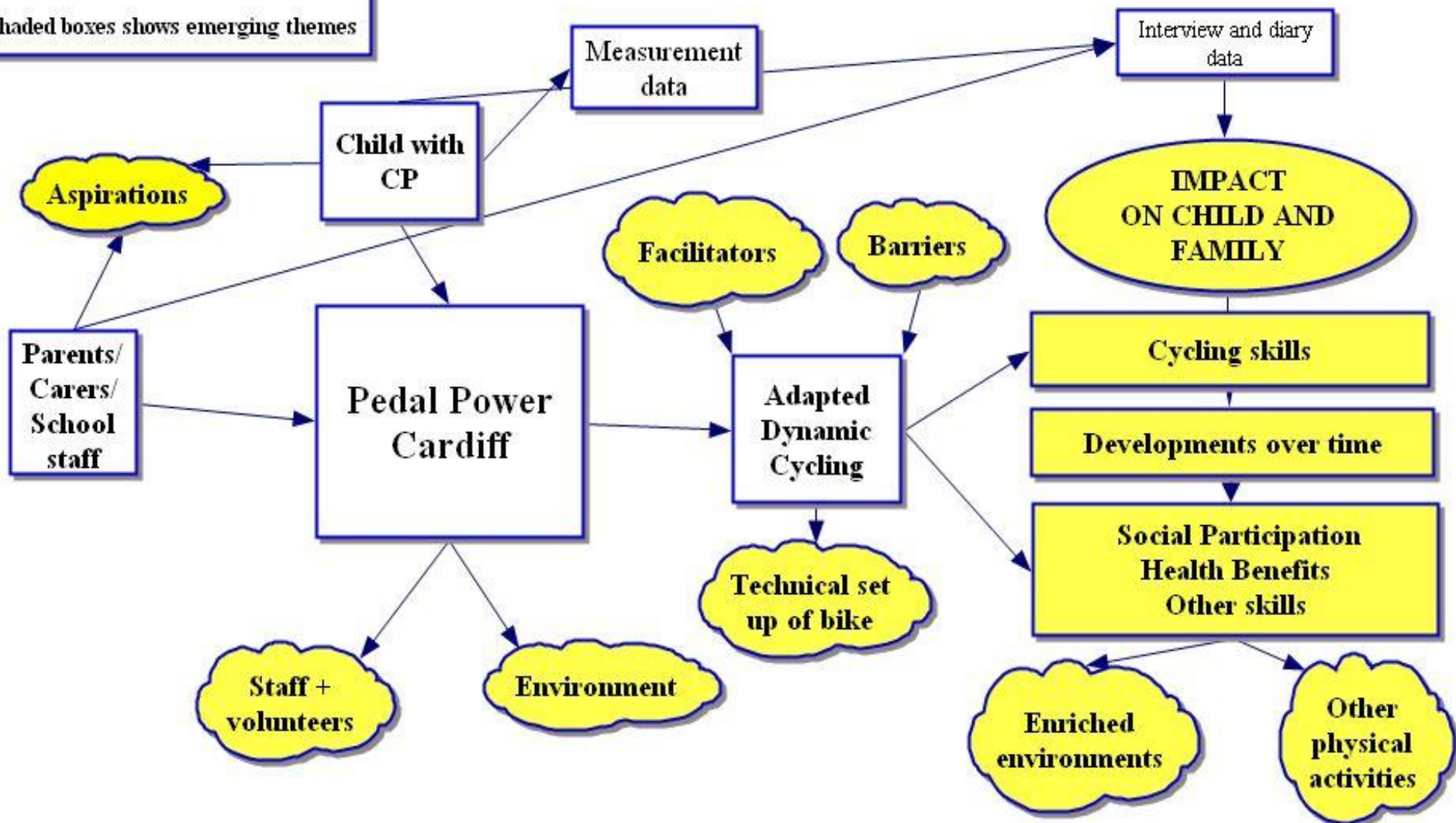
# Thematic analysis Pickering et al, 2012b

Figure 2 Themes

Key:

Clear boxes are topics being explored

Shaded boxes shows emerging themes



Peter: *I did cycling .....it was wicked !*



## ▶ Peter's Mum:

*'The physio put him on the TomCat trike, strapped his feet in and it was the first time ever he pedalled and he couldn't stop it. Everybody got so emotional, fantastic. It just shows if you've got the tools for the job, the right equipment, you can do it'*



# Social participation



I: “So, what’s it like if you haven’t got a bike when you are with your friends at the caravan?”

Diane: “I normally tag along, walk for a while, ponder my thoughts, get bored....The bike’s great, easier to get around than walking. Clever, clever invention whoever invented it, I want to thank them....”

**Diane (10years, Diplegia) who completed the diary by herself and drew this picture**





# Limitations

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## Practical limitations:

- ▶ Rigour: Standardisation of intervention
- ▶ Weather
- ▶ Cycle computer and monitors
- ▶ Intervention – only 6 sessions
- ▶ Diaries



# Implications for clinical practice

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- ▶ **Community facility** in an appropriate area-  
**Access** to a grass roots cycling area
- ▶ **Policy makers** to consider adapted cycle hire within a 50 mile radius
- ▶ **Strengthening** through cycling through **participation**- maintaining
- ▶ No change in popliteal angle
- ▶ **Quality of life** - Children and families enjoyed the participation







# Conclusions

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- ▶ The children who took part in adapted cycling enjoyed this experience and it improved their sense of well being and had a positive effect on muscle strength.
- ▶ Policy makers should consider adapted cycle hire in their region.
- ▶ Physiotherapists and other Healthcare professionals can carry out creative research to hear the voice of children and young people with CP.



# Acknowledgements

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- ▶ Nancie Finnie Charitable Trust
- ▶ Children, families and carers who took part
- ▶ Pedal Power Trustees
- ▶ Bike-shed staff and volunteers
- ▶ BBC Children in Need
- ▶ Jenx Ltd
- ▶ NHS physiotherapists in England and Wales who helped us recruit to control group (yet to be reported)
- ▶ Polar



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# THANK YOU FOR LISTENING

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▶ ANY  
QUESTIONS ?

