Investigating the Clinical Effects of Performance-Focused Swimming Training for People with Cerebral Palsy: a Proof of Concept Study

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Background: Cerebral Palsy and Physical Activity

- People with CP have physical impairments → ↓ ADLs → ↓ Participation
- Low levels of physical activity → ↓ Health status
- Recent research focus on moderate doses of physical activity
- Generally, it is recognised that moderate doses of physical activity can elicit favourable clinical outcomes

Cerebral Palsy and Performance-Focused Sports Training

- What about the clinical effect of physical activity which is designed to improve sports performance?
- 'Performance-Focused' training is typically associated with greater doses
- Paralympic athletes anecdotally attribute excellent clinical outcomes to their training

*'Hard training means 9 sessions per week, 2 hours per session of intense training. I haven't always been able to do that – it took me years to reach that level...**if I didn't have swimming I'd probably be in a wheelchair, overweight and very fragile'.***

Jaqueline Freney, 2014

Therapeutic Value of Sport?

- Can these stories be substantiated with scientific evidence?
- Can training loads associated with sports training positively affect health and the impairments themselves?
- Aim:
  Evaluate the relationship between performance-focused swimming training and the clinical outcomes of Health-Related QoL and Gross Motor Function

Study Design

- Single Subject Research Design
- 1 Participant
- 3 Phases
  - A^1 = Baseline (15 weeks)
  - B = Training (30 weeks)
  - A^2 = Off-season (15 weeks)

Intervention

A^1		B		A^2
Baseline	Intervention (Introductory training)		Intervention (Performance-focused training)	Off-season
15 weeks	15 weeks		15 weeks	15 weeks

- First Part of B Phase – introduction to sport
  - Low-moderate dose
  - Aerobic, Strength, Flexibility, Neuromotor Training

- Second Part of B Phase aims to optimise swimming performance
  - Higher dose (frequency, intensity, duration)
  - Intentional reduction leading into competition

Participant

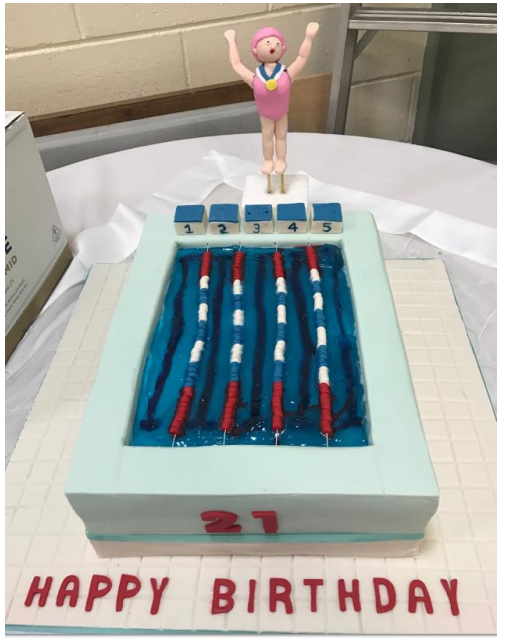
- 21 years old
- Ataxic Cerebral Palsy
- GMFCS II, S7
- Insufficiently active for health
- Water safe
- Medically, intellectually able to train

Outcome Measures

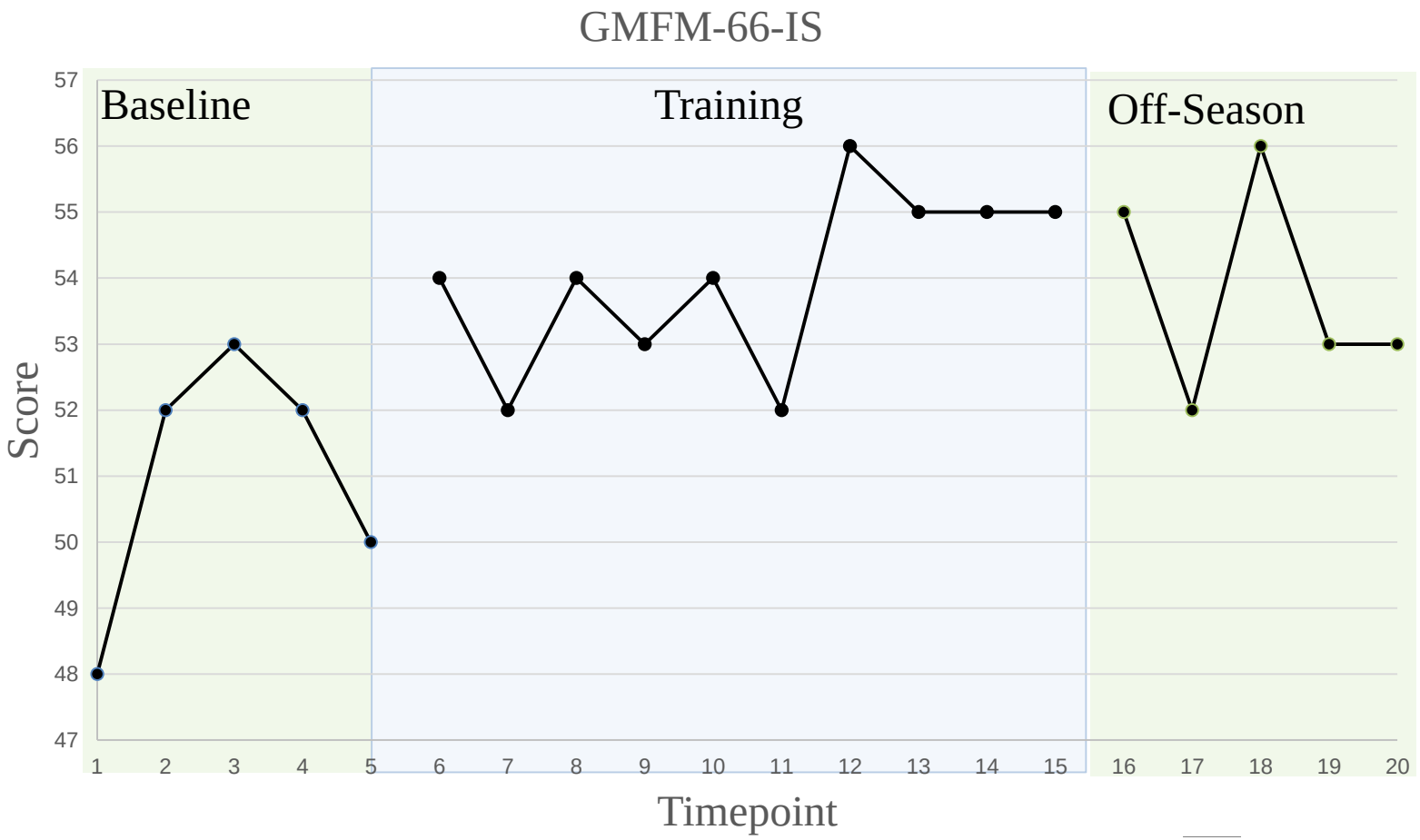
- Health-Related QoL
  - SF-36 Physical Function Subscale
- Gross Motor Function Measure-66-Item Set
  - GMFM-66-IS
- Repeated measures: 5 data points in baseline, 10 in training, 5 in off-season
- Analysis: Data is plotted, visual analysis of central tendency and percentage non-overlapping data (Parker et al. 2007)

Results

- Training load well tolerated
- Positive changes in swim performance seen: 25m freestyle swim time reduced from 82s to 49s.
- Full description in presentation this afternoon: Angelo Macaro

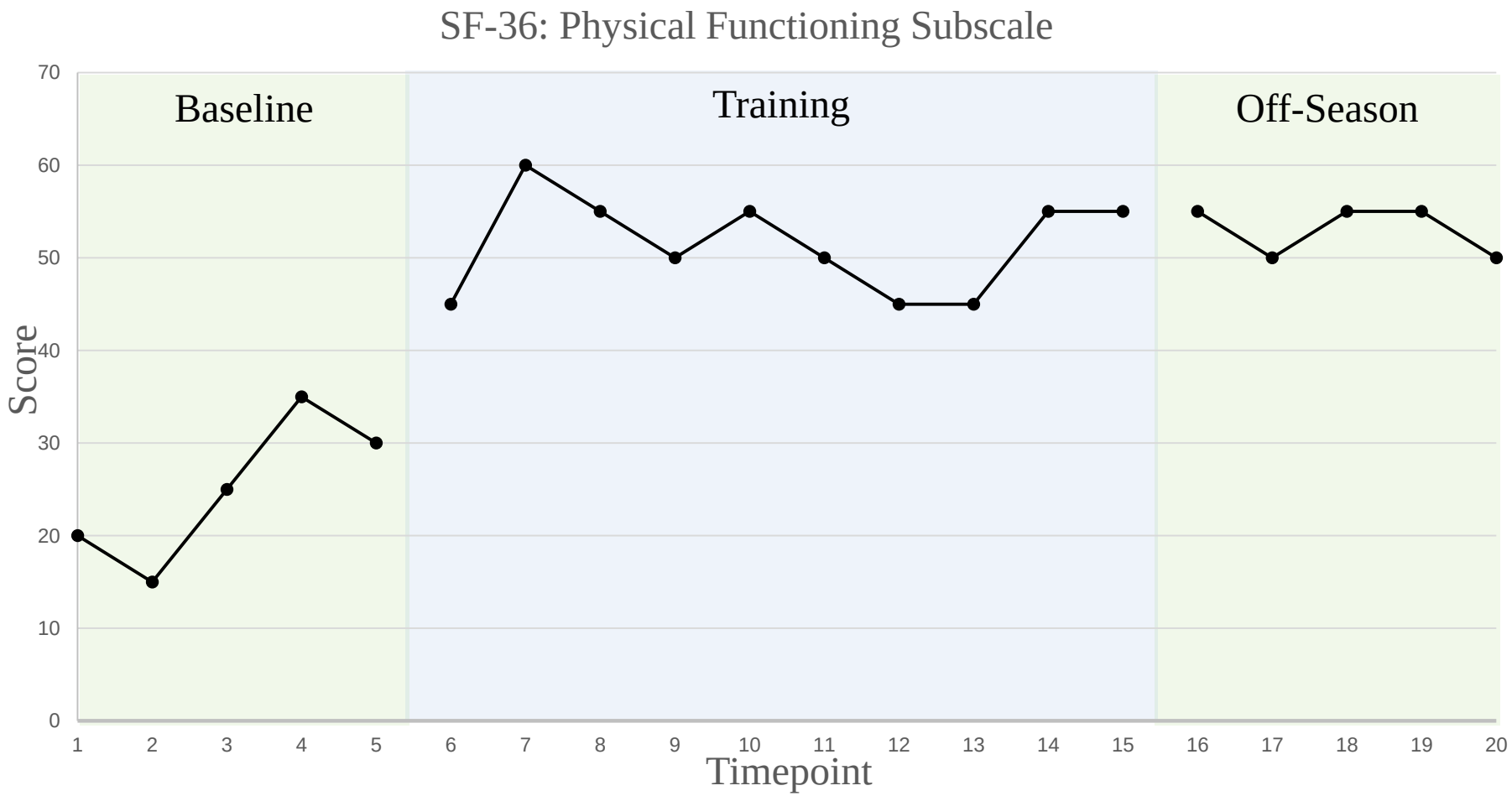


Results: Gross Motor Function



Median	**52**	**54**	**53**
PND	**N/A**	**70% = moderate effect**	**0%**

Results: SF-36 Physical Functioning Subscale



Med	**25**	**52.5**	**55**
PND	**N/A**	**100% = very high effect**	**0%**

Conclusions

- A promising start at a proof-of-concept level: acceptable study design, outcome measures and intervention structure
- Functional relationship may exist
- Future research is required – continue longitudinal monitoring, multiple baseline design across 3 participants
- Implications for Neurological Rehab – sport as a therapy

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