

Energy Cost of Walking in Polio Survivors

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Introduction

Energy cost of walking (ECOW) is elevated in Polio survivors, but gold standard measurement techniques are expensive and time consuming in clinical practice. Physiotherapists need to comprehensively assess Polio Survivors in order to implement management programmes and evaluate their outcome. The Physiological Cost Index may be an appropriate clinical tool for ECOW assessment.

Purpose

- To measure energy cost of walking using the PCI, in Polio Survivors and in age and sex matched healthy controls
- To measure fatigue, strength, pain and quality of life and to examine the relationships between energy cost of walking and these variables.

Methods

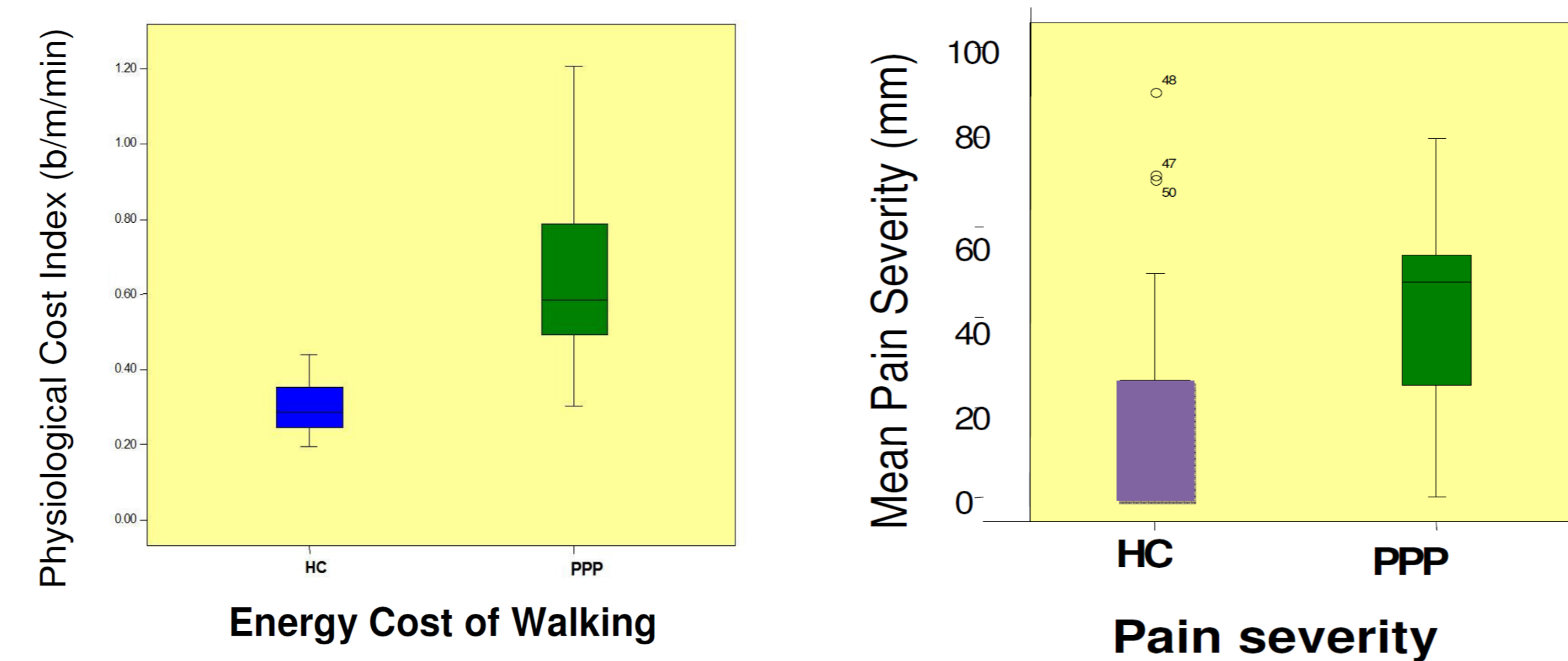
Variables of interest were measured in 30 people with a history of Polio and 30 age and sex matched controls using the assessment tools outlined the table below.

Variable	Assessment tool
Energy Cost of Walking	Physiological Cost Index (PCI) ($PCI = \frac{\text{Walking heart rate} - \text{resting heart rate (beats/min)}}{\text{walking speed (m/min)}}$).
Isometric Muscle Strength	Quantitative Muscle Assessment
Subjective fatigue	Piper Fatigue Scale (PFS)
Pain	Visual Analogue Scales
Quality of Life	SF-36

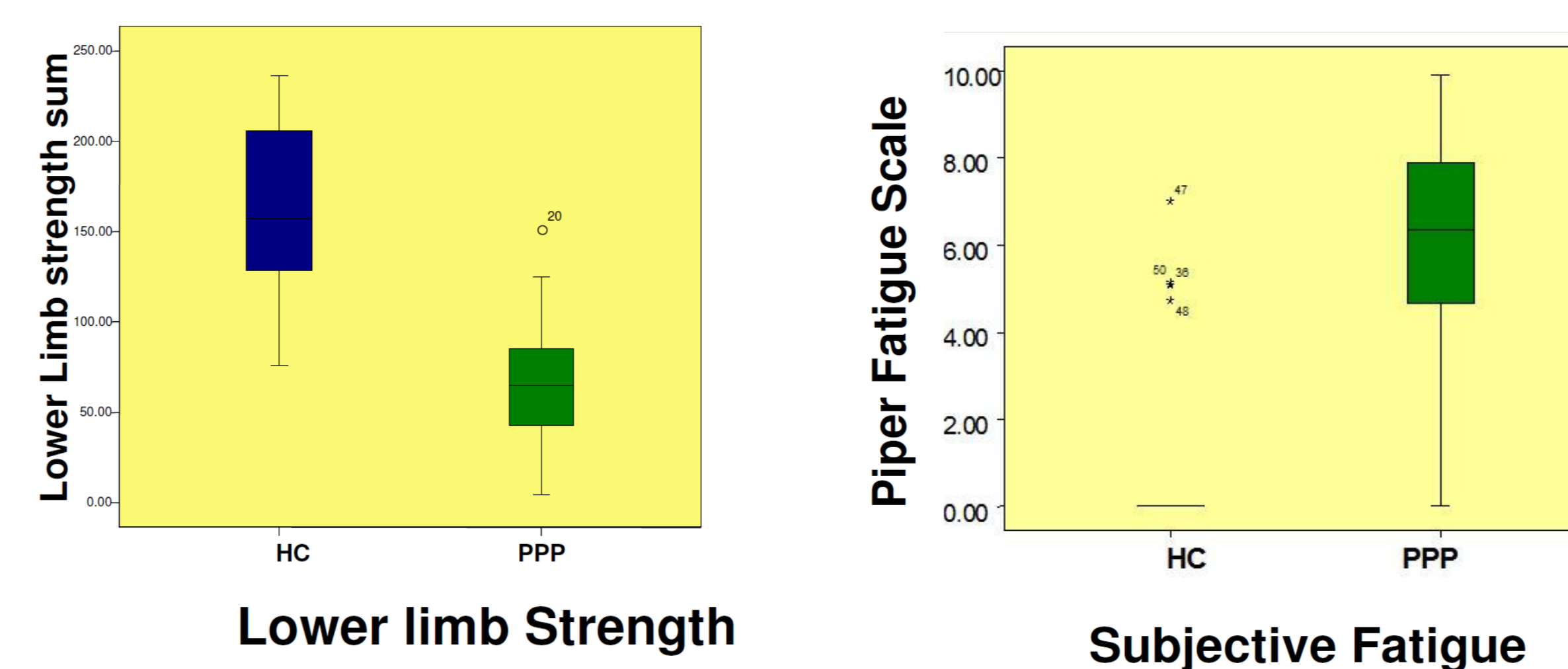
Summary statistics and graphs were generated and appropriate statistical analysis used to compare the groups and examine relationships between variables. Ordered logistic regression was carried out to establish the factors influencing energy cost of walking (ECOW) and QOL.

Results

Energy cost of walking in Polio Survivors was more than twice that of the controls ($p < 0.001$), with a wide variability among Polio Survivors. People with a history of Polio reported significant pain compared with healthy controls ($p < 0.0001$).



People with a history of Polio were significantly weaker ($p < 0.001$) and more fatigued ($p < 0.001$) than controls.



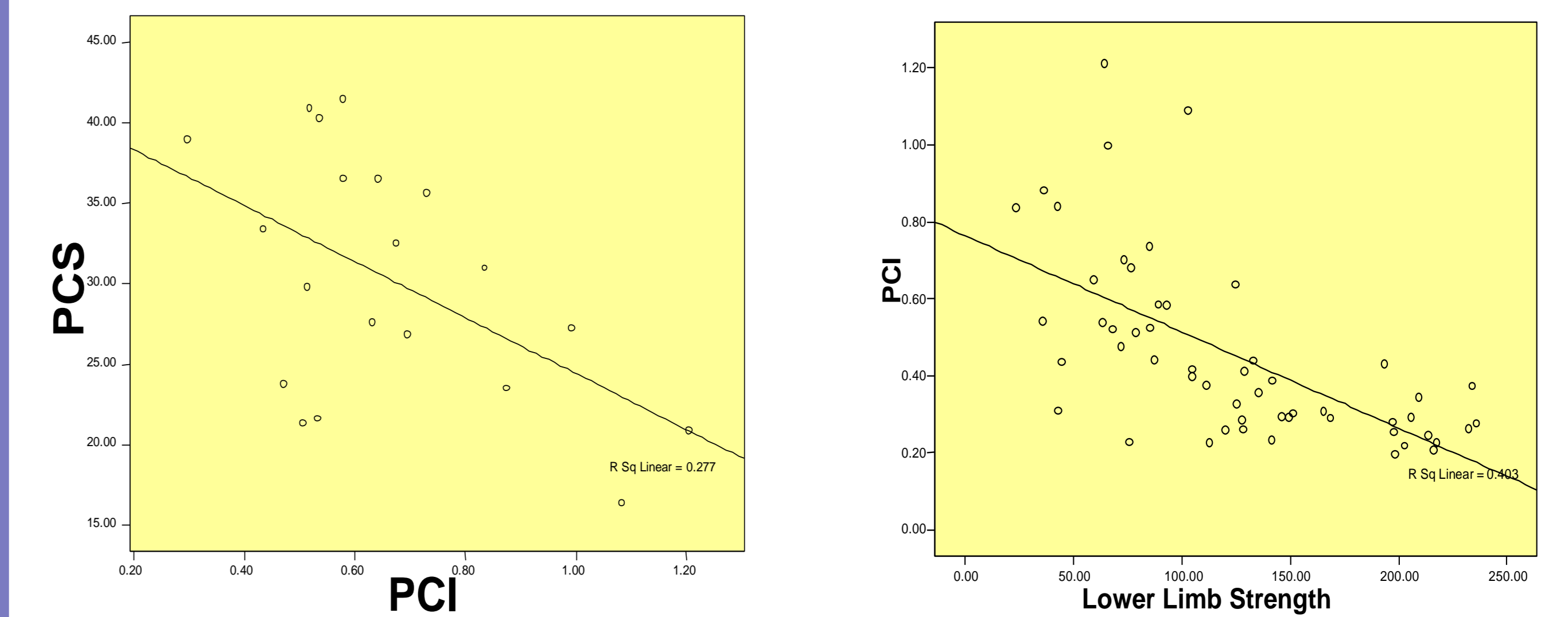
Both Physical (PCS) and Mental Components (MCS) of the SF-36 were below normal.

	Prior Polio		Normals*		
	n	Mean (SD)	Mean (SD)	p	95% CI
SF-36 PCS	26	30.26 (7.24)	48.5 (10.09)*	<0.001	(-21.58,-14.9)
SF-36 MCS	26	45.77 (13.91)	53.4 (8.19)*	0.012	(-13.18,-2.08)

*Irish normative data for men and women (n=115) aged 45-74

Results

Pain predicted ECOW ($p=0.04$), with more pain associated with lower ECOW. ECOW predicted the physical component (PCS) of QOL ($p=0.008$). Lower limb strength and PCI were correlated with stronger legs associated with lower PCI.



Discussion & Conclusions

Polio Survivors are weaker, more fatigued and have more pain than their peers. Energy cost of walking is significantly elevated and QOL is compromised. Pain seems to be associated with lower more normal energy cost of walking. This may be because those with better mobility have more activity related pain and fatigue. Elevated energy cost of walking negatively influence QOL. A clinically accessible assessment tool for Energy cost of Walking was utilised and shown to distinguish Polio Survivors from controls, while also predicting quality of life. Further assessment of PCI as an assessment tool is warranted.

Recommendations

Physiotherapists need to focus on management of pain and fatigue in people with a history of Polio, as well as ensuring that efficiency of gait is maximised. Assessment of muscle strength, fatigue, pain and quality of life are core to evaluation of these patients.

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