

Standing Up in people with progressive Multiple Sclerosis (SUMS): a multi-centre randomised controlled trial evaluating a home based standing frame programme.

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Background

People who are severely impaired with progressive MS sit three times longer than the general population, for an average of 11 hours/day. Secondary physical and psychosocial complications can result. These are costly, and many are potentially preventable and reversible. We asked whether a self managed, home based standing frame programme could address this problem.

Aims and Objectives

Aims: To establish the clinical and cost effectiveness of a home based, self managed standing programme plus usual care in improving motor function at 36 weeks.

Objectives: To investigate explanatory physical impairments, clinical outcomes, and health-related quality of life.

Design and Methods

Design: Pragmatic, multi-centre, blinded, randomised stratified controlled trial

Methods: Eligible participants stratified according to Expanded Disability Status Scale category (≥ 7.5 , < 7.5) and region (South West or East Anglia).

Participants were randomly allocated (1:1) to receive either Standing frame programme (with advice and support) plus usual care or Usual care alone.

All participants completed a daily diary recording adverse events, new symptoms, falls, medication changes. The standing group also recorded the number of times/ duration of each standing session.

Blinded Assessments: at baseline, week 20 and week 36 by a research physiotherapist

Analyses: Pre-specified and followed the intention-to-treat approach, utilising analysis of covariance comparing AMCA scores at week 36 between allocated groups, baseline adjusted for AMCA and stratification factors

Key Inclusion criteria

Confirmed diagnosis of progressive MS, scoring EDSS 6.5-8.0
Able to accommodate a standing frame within the home
Able to travel to local centres for assessment

Outcome measure	Domain
Primary outcome measure	
Amended Motor Club Assessment (AMCA)	Motor function
QaLY (by the EQ-5D)	Quality adjusted life years
Secondary outcome measures	
Goniometry (hip, knee, ankle)	Joint range of motion
Dynamometry (knee extensors)	Quadriceps strength
Penn Spasm Frequency Scale (7 day diary)	Spasms
Forced expiratory volume	Respiratory function
Functional reach in sitting	Sitting balance
Bladder and Bowel Control Scales	Bladder and Bowel function
Multiple Sclerosis Impact Scale (MSIS-29)	Quality of life

The Standing Intervention



Two x one hour, home based, face-to-face physiotherapy sessions. Requested to stand for 30 minutes, 3 times per week, but more if wished.

Face-to-face sessions supported by weekly telephone calls (~15 minutes) for 4 weeks, and then monthly for 2 months. Calls focused on facilitating individuals to set and achieve personal targets.

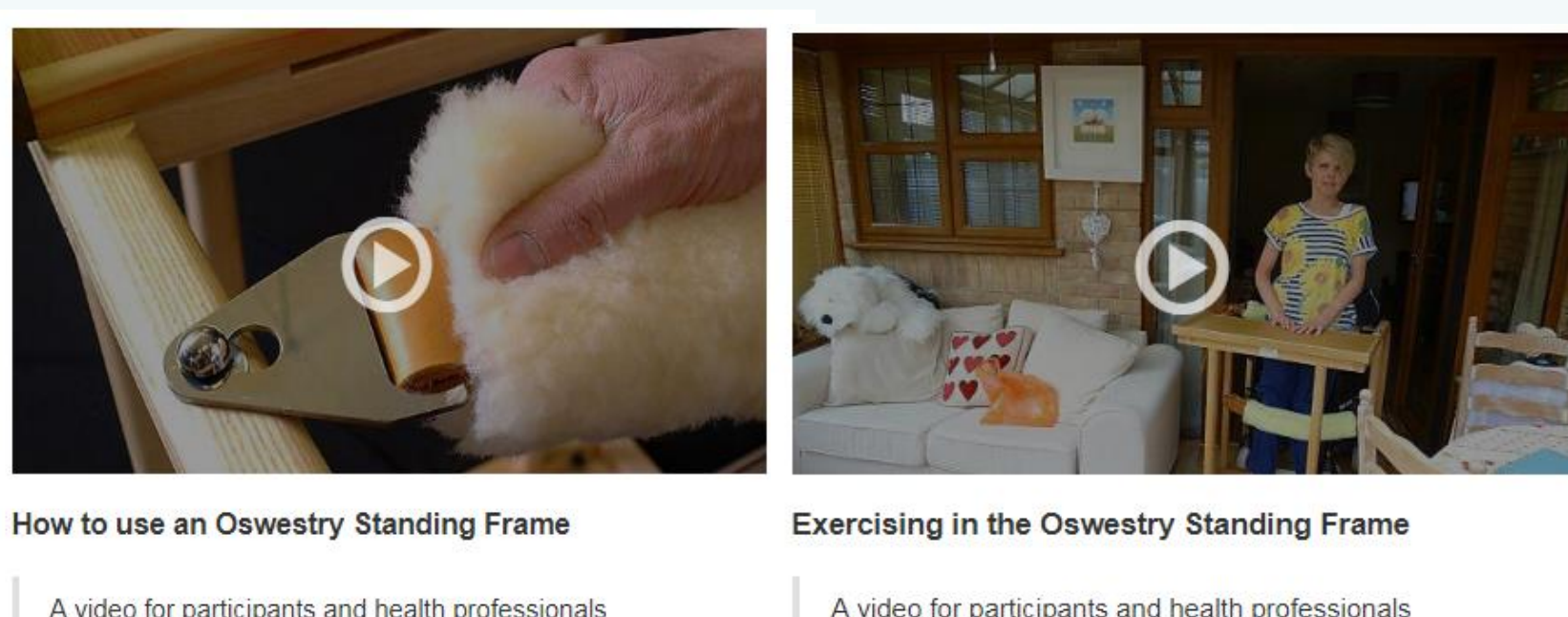


Fig. 1 A range of resources were provided to therapists and patients to support the physiotherapy sessions.

Results

Sample

285 people with progressive MS were screened, of whom 140 were recruited from eight centres (mean [sd]: age 59.1 yrs [9.4], EDSS 7.3 [0.6]; 64% female, 69% secondary progressive, 71% daily wheelchair users). 12 participants withdrew.

Clinical Outcomes

Most people stood regularly, with 66% continuing over the 36-weeks; 70% chose to keep their frame after completing the trial.

Adjusted AMCA at week 36 was significantly higher in the standing frame group (n=61) compared to control group (n=61) (adjusted between-group difference 4.7 [95% CI 1.9 to 7.5], p=0.001). (Table 2, Fig 2)

Complier analysis showed this difference increased to 7.9 points [95% CI 3.1-12.7) when standing ≥ 72 minutes / week (Table 3).

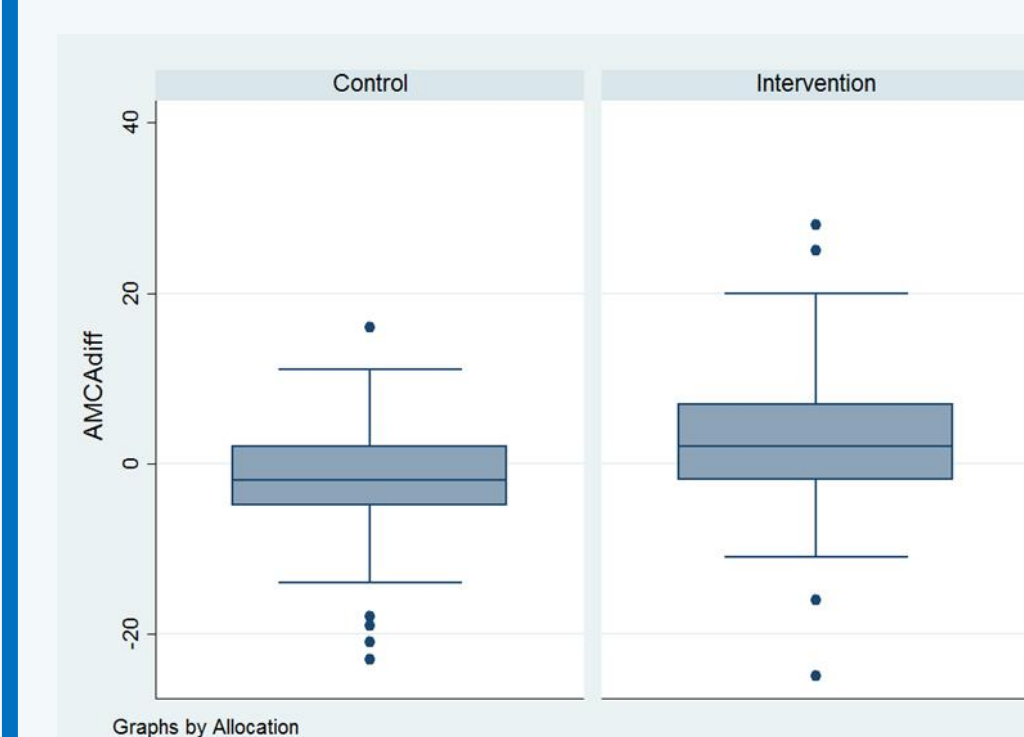


Table 2, Fig 2a : Primary outcome results (clinical)

Mean (sd) [Range]		Adjusted Analysis	
Intervention (n=61)	Control (n=61)	Mean Difference (Intervention-Control) (95% CI)	P-value
W36 - Baseline	W36 - Baseline		
2.5 (9.0) [-25,28]	-2.0 (7.4) [-21,16]	4.7 (1.9, 7.5)	0.001

Table 3, Complier Analysis

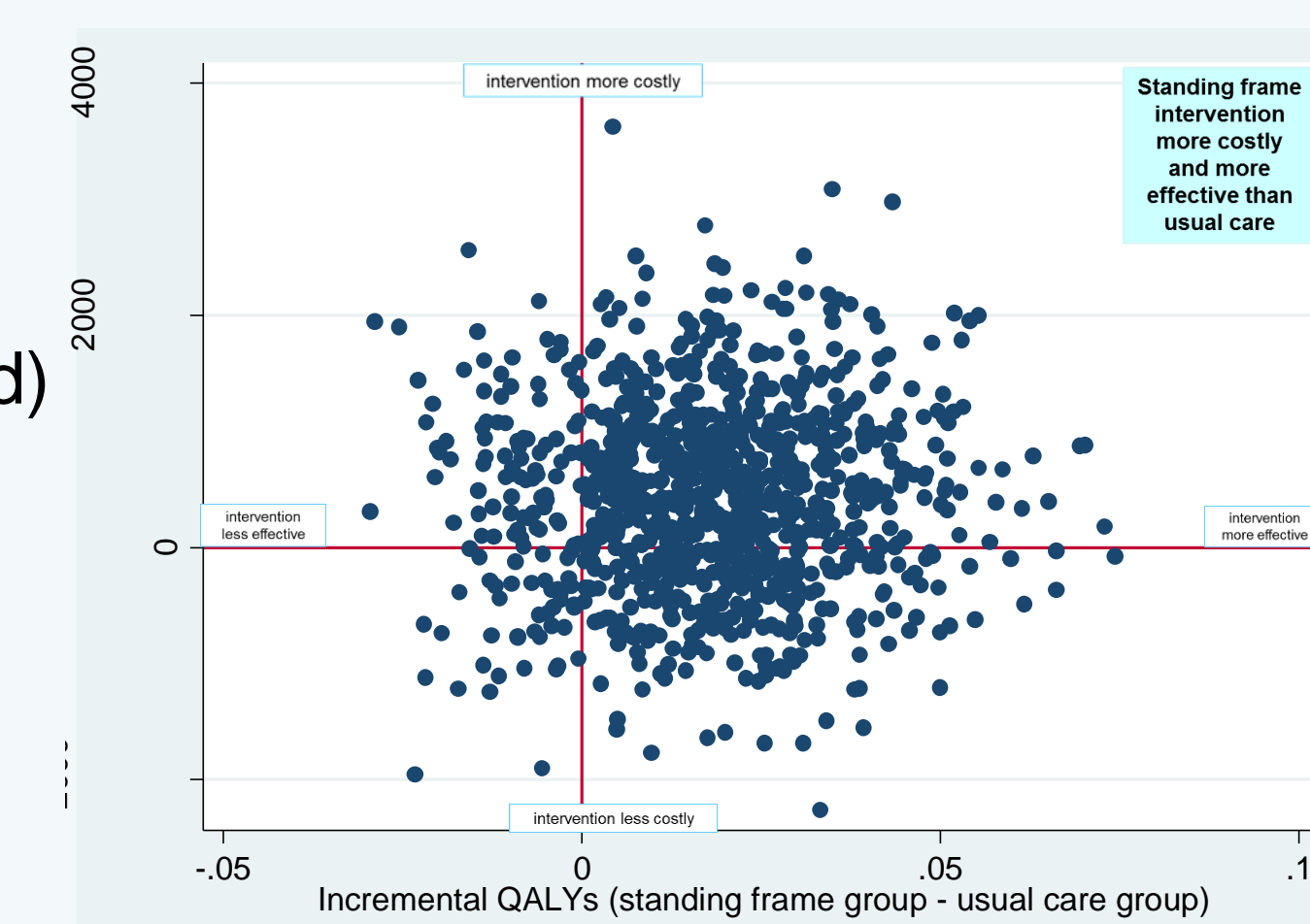
	Compliers	Non-Compliers / Control	Adjusted Analysis ³	
	W36 - Baseline	W36 - Baseline	Mean Difference (Int.-Control) (95% CI)	P-value
Best 32 weeks	N = 43 4.2 (-4,28)	N = 79 -1.9 (-25,17)	6.5 (2.7, 10.4)	0.001
Worst 32 weeks	N = 35 3.8 (-4,28)	N = 87 -1.1 (-25,18)	7.9 (3.1,12.7)	0.001
Weeks 5-36	N = 41 4.4 (-4,28)	N = 81 -1.8 (-25,17)	6.8 (2.8,10.8)	0.001

Health Economic Evaluation

Standing frame group costs were ~ £268 more than usual care for NHS/ Personal Social Services.

Quality Adjusted life years: Standing group had a mean (adjusted) of 0.006 (0.018) additional QALYs over the 36 weeks, compared to the control group

Cost-effectiveness analysis: The base case cost per QALY was £14,733, which is below the recommended willingness to pay threshold of £20,000 to £30,000 per QALY



Discussion

- This is the first definitive multi-centre randomised controlled trial of standing in people with progressive MS.
- Participants varied in their response to standing, but there was an association between those that stood longer and the magnitude of benefit gained.
- Most people (66%) continued to use the frame over the 36 week period, and requested to keep the frame at the end of the study so as to continue standing.
- The results are applicable to people with MS who, at best, can walk 20 metres with bilateral walking aids.

Ethics approval: The study protocol, participant information and enrolment procedures were assessed and approved through the National Research Ethics Scheme (NRES Committee South West Bristol EC ref no. 15/SW/0088) on 13.5.2015.

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Conclusions and Clinical Implementation

- The standing intervention was feasible to implement within a NHS context.
- Standing resulted in significant benefits in motor function compared to usual care alone.
- Changes in motor function were clinically meaningful when patients stood for more than one hour/week.
- The standing programme is cost-effective in line with the threshold employed by the National Institute for Health and Care Excellence
- Patients enjoyed standing and felt they benefitted from it, as highlighted by the embedded qualitative study.
- The standing programme is clinically and cost effective and should be a recommended management option for people with progressive MS who find it difficult to stand and walk.
- To facilitate implementation and decision-making, resources (Fig. 2) are freely available on www.plymouth.ac.uk/research/sums