

Oculomotor re-training in people with progressive Multiple Sclerosis and cerebellar signs: A proof of concept study

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**Background:** Cerebellar Ataxia is seen in up to 80% of people with Multiple Sclerosis (MS) with symptoms being more frequent in people with progressive MS. Many activities that people with cerebellar signs find difficult such as manipulation balancing and walking require accurate oculomotor control.

**Aim:** This study investigated: (a) differences in oculomotor control, upper limb function and balance between people with progressive MS and healthy participants (b) the effects of a 4 week oculomotor training program on clinical signs and visuo-motor ability in people with MS.

**Methods:** Baseline outcome measures as symptom severity, SARA and functional capacity tests in people with MS were compared to matched healthy participants.

People with Progressive MS were randomised to the intervention (n=15) or control group (n=13). Intervention consisted of 15 minutes of individualised home-based oculomotor training every day for 4 weeks. The control group continued with usual care. Before and after intervention period measures were taken of clinical outcome (Functional Reach FRT; 25 foot walking test; box and blocks test; 9 hole peg test; Scale for Assessment and Rating of Ataxia) and visuomotor performance (postural sway and step- or ramp eye-hand tracking).

Differences in baseline scores between groups were compared using unpaired t -tests. Changes with intervention in people with MS were assessed using a between groups repeated measures ANOVA

**Results:** Twenty eight people with progressive MS (Age  $54.4 \pm 8.7$  yrs; EDSS 6, range 2.5-8) and 22 healthy participants (age  $54.9 \pm 9.1$ ) were recruited. People with MS were significantly impaired on all clinical outcome measures. Antero-posterior postural sway was greater ( $P < 0.05$ ) and error during step and ramp eye-hand tracking was worse in people with MS. Baseline measures between the MS intervention and usual care groups were not significantly different. Two people in the experimental group were lost to follow up. Functional balance (FRT) decreased in the experimental group by 5 cm ( $P < 0.05$ ) but manual dexterity was not affected. There were no differences in postural sway between groups or over time. Movement error during step tracking significantly improved with oculomotor training (Group x time interaction  $P < 0.05$ ).

**Conclusions:** People with progressive MS and cerebellar signs show impairments in visuomotor skills. Oculomotor training can improve eye hand co-ordination but not clinical functional measures.

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