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VEstibular Rehabilitation in MultIple Sclerosis

Submission date
03/09/2018

Recruitment status
No longer recruiting

Registration date
24/09/2018

Overall study status
Completed

Last Edited
18/06/2025

Condition category
Nervous System Diseases

[X] Prospectively registered
[X] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Symptoms of dizziness or vertigo in multiple sclerosis (MS) can be caused by problems with the inner ear (termed vestibular system), in the signalling in the nerves supplying the vestibular system and in processing of signals in the brain. It is currently unclear in people with multiple sclerosis whether available treatments are effective and whether symptom relief lasts after cessation of treatment.
This study aims to compare the clinical and cost-effectiveness of a 12-week customised home-based rehabilitation program with a home-based program delivered via a generic standard format exercise booklet in people with MS (pwMS) and peripheral or central vestibulopathy. A secondary study will explore whether people with MS with another inner ear disorder caused by dislodged crystals in the inner ear (termed benign paroxysmal positional vertigo or BPPV) respond to repositioning manoeuvres and whether the symptoms re-occur over the next 12 months.

Who can participate?
Adults with multiple sclerosis who can walk at least 20 m and have symptoms of dizziness or vertigo

What does the study involve?
Participants with difficulties in processing how inner ear (vestibular signals) are processed in the peripheral nerves or in the brain will be entered after screening into a trial. Participants will be randomly allocated to one of two groups. Group 1 will receive customised exercises, involving a 12 week home programme of exercises targeting specific problems, supplemented by 12 face-to-face sessions with a physiotherapist. Group 2 will receive generic exercises, involving a 12 week home programme of exercises from a booklet and 2 telephone calls with a physiotherapist. Measures, which will include questionnaires, diaries and interviews will be taken at the start and end of the study, in order to assess symptoms, balance and walking, cost and effectiveness. Participants with evidence of BPPV will be treated with an appropriate repositioning manoeuvre with up to 3 sessions. The success rate of the repositioning manoeuvres will be measured and the re-occurrence rate if symptoms monitored over 12 months.

What are the possible benefits and risks of participating?
The possible benefit of participating is that the booklet-based or customised-based exercise programs for dizziness could both reduce symptoms of dizziness and imbalance. However, a

possible risk is that the tests may cause fatigue and muscle soreness. The tests and treatment will bring on people’s symptoms. This is required to diagnose and then treat the condition. The treatments will challenge participants' balance. There is a risk of falling but the therapist will ensure that people are safe when exercising.

Where is the study run from?
Plymouth Hospitals NHS Trust and 3 other sites in the UK

When is the study starting and how long is it expected to run for?
July 2018 to September 2021

Who is funding the study?
The Multiple Sclerosis Society (Joint Physiotherapy Research Foundation) (UK)

Who is the main contact?
Jonathan Marsden
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Contact information

Type(s)
Public

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Protocol serial number
38587

Study information

Scientific Title
VEstibular Rehabilitation in MultIple Sclerosis: a randomised controlled trial and cost-effectiveness analysis comparing customised with booklet based vestibular rehabilitation for vestibulopathy and a 12 month observational cohort study of the symptom reduction and recurrence rate following treatment for Benign Paroxysmal Positional Vertigo.

Acronym
VERMIS

Study objectives
Customised 12-week home based vestibular rehabilitation programme plus usual care (intervention) is better than a home based programme delivered via a generic standard format written exercise booklet plus usual care (control).

Ethics approval required
Old ethics approval format

Ethics approval(s)
South West - Cornwall & Plymouth Research Ethics Committee, 20/07/2018, REC Reference 18 /SW/0145, PROTOCOL Number FHHS-243306-JM-218, IRAS ID 243306

Study design
Randomised; Both; Design type: Treatment, Rehabilitation, Cohort study

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Vestibular impairment in people with multiple sclerosis

Interventions
Interventional study (trial 1):
Participants identified with either a peripheral or central vestibular impairment will be entered into the randomised controlled trial (RCT) and randomly allocated to either the intervention or control group, using a computer programme (REDCap). A minimisation procedure with a random element will be used to allocate people with multiple sclerosis (pwMS) into the home based generic programme (control) or the customised, VR programme (intervention). The following factors will be used in the minimisation procedure:
1. Diagnosis: peripheral (unilateral or bilateral) vs central or combined vestibulopathy
2. Severity: DHI ≥59 vs DHI <59 (In pwMS, a score of 59 distinguishes fallers from non-fallers)
3. Prescribed fampridine vs not prescribed fampridine
Participants with MS and peripheral or central vestibulopathy will be randomised in a 1:1 ratio either to a customised 12-week home based vestibular rehabilitation programme plus usual care (intervention) or to a home based programme delivered via a generic standard format written exercise booklet plus usual care (control).
The control group will receive a one hour individualized physiotherapy session, during which they will receive the validated self management “Balance Rehabilitation” booklet, providing comprehensive advice on VR exercises. They will be provided with instructions on how to use the booklet. The booklet explains how VR exercises help improve vestibular symptoms and includes instructions on how to practice the exercises included in the programme. Participants will be asked to practice the exercises daily unsupervised at home for 12 weeks and to fill out a daily diary sheet indicating treatment duration and content. They will receive telephone support from the treating therapist with two further 15 minute phone calls in week 1 and week 4 focusing on adherence, barriers to adherence and to discuss any concerns and queries regarding the exercise

programme.
The intervention group will receive 12 individualiaed community-based one hour supervised vestibular rehabilitation sessions over a 12 week period, typically on a weekly basis. Each participant will practice the following type of exercises:
1. Eye, head, and postural exercises that provoke a patient's symptoms.
2. Exercises to re-train postural alignment and movement strategies
3. Re-training sensory strategies
4. Learning to adapt strategies to changing contexts
5. Dual task training
6. Postural orientation exercises
8. Neuromuscular (ankle-hip-stepping motor strategies) strategies
The duration and number of exercises completed in each session will be determined by each patient's capacity. At each supervised session progress will be assessed, any concerns discussed, exercises not yet included in the home programme practiced, and exercises modified to gradually increase task difficulty. Each participant will be provided with an individualised home exercise programme of 3-5 exercises to practice for 1 minute, twice daily on days they do not have a session with the therapist. Participants will be asked to fill out a diary sheet indicating treatment duration and content. At the last session, a home maintenance programme will be provided.
Standardised, validated clinician-rated assessments and patient self-reported clinical outcome will be measured at baseline (T0) prior to randomisation. Baseline measurement (T0) occurs 2 weeks prior to the onset of intervention. Measures will also be taken post intervention, 14 weeks after the baseline measurement (T14) and 26 weeks after the baseline measurement (T26).

Observational study (trial 2):
Trial 2 is a single group observational study investigating the success and re-occurrence rate of symptoms with repositioning manoeuvres in an estimated 70 ambulant individuals with MS who have clinically confirmed benign paroxysmal positional vertigo (BPPV).
Following the diagnosis of BPPV at assessment 1 an Epley manoeuvre will be performed for people identified as having a posterior canal BPPV . Participants diagnosed with horizontal canal BPPV will have treatment with the "barbecue rotation" manoeuvre or Forced Prolonged Position. Participants will be asked to return to the clinic after one week to re-test for any residual BPPV. The appropriate test for BPPV will be repeated. For posterior canal-BBPV if the Dix-Hallpike test is positive or vertigo symptoms continue, the Epley manoeuvre will be repeated. If after a further week participants are symptom free (based on a Vertigo Symptom Scale score <0.3/4) no further action will be taken. Participants with ongoing vertigo and/or balance and gait impairment will be provided with a self-management "Balance rehabilitation" booklet providing comprehensive advice on VR exercises. The number of treatment sessions will be recorded and at the last treatment session participants will be asked to repeat the subjective outcome measures and dynamic gait index test.
Participants will be asked to attend for a follow-up 26 and 52 weeks (+/- 2 weeks) after their last appointment to re-assess for BPPV and complete subjective vestibular specific questionnaires and the Dynamic Gait Index.

Intervention Type
Other

Primary outcome(s)
Primary outcome measure for trial 1 (interventional study):
Impact of dizziness on daily life (functionally, emotionally and physically), assessed using the

Dizziness Handicap Inventory (DHI) questionnaire at the baseline, after 14 weeks and after 26 weeks

Primary outcome measure for trial 2 (observational study):
Presence of BPPV as assessed using the Dix-Hallpike test and the log roll test at the baseline, after one week and after 26 and 52 weeks

Key secondary outcome(s))

Secondary outcome measures for trial 1 (interventional study) -t he following will be assessed at the baseline, after 14 weeks and after 26 weeks unless otherwise stated:
1. Impact of multiple sclerosis (MS) on walking using the 12-item Multiple Sclerosis Walking Scale (MSWS-12)
2. Perceived confidence in performing 16 activities of daily living, assessed using the Activities-Specific Balance Confidence (ABC) scale
3. Symptoms of poor balance and increased anxiety and arousal as a result of vertigo, assessed using the Vertigo Symptom Scale (short form) (VSS)
4. Visually induced dizziness symptoms, assessed using the Situational Characteristic Questionnaire
5. MS-specific health-related quality of life, assessed using the 29-item Multiple Sclerosis Impact Scale (MSIS-29) Version 2.0
6. MS-specific fatigue, assessed using the Fatigue Scale for Motor and Cognitive functions (FSMC)
7. Depression and anxiety, assessed using the Hospital Anxiety and Depression Scale (HADS)
8. Health status (mobility, self-care, usual activities, pain/discomfort and anxiety/depression), assessed using the EQ-5D-5L
9. Falls over the past month, assessed using a retrospective diary at the baseline
10. Prospective falls over 12 weeks, assessed using a prospective falls diary at assessment 2 and follow-up
11. Functional walking, assessed using the Dynamic Gait Index (DGI)
12. Vestibulo-ocular reflex function:
12.1. Visual acuity assessed using the Freiburg Visual Acuity Test (FrACT) Landolt C protocol
12.2. Dynamic visual acuity assessed by passively moving the head back and forth through a 400 arc in a horizontal plane at a frequency of approximately 1.5 Hz
13. Visual dependency, assessed using a Rod and Disc test involving participants determining their subjective visual vertical by indicating when a luminous rod is vertical either in darkness or when it is placed in front of a patterned disc rotating in the frontal plane (laptop version)
14. Cognitive impairment and processing speed, assessed using a single digit modalities test (SDMT) wherein participants have 90 seconds to pair specific numbers with given geometric figures. Responses can be written or given.
15. Compliance and user satisfaction, assessed using a short exit interview at the end of the study to explore:
15.1. Enablers and barriers to continuing the exercises
15.2. If people are satisfied with the treatment allocated
15.3. Whether participants perceive any improvements
16. Treatment fidelity, assessed at the end of the study using:
16.1. A standardised proforma, completed by the treating therapists outlining exercises taught and the agreed frequency of training as well as any advice provided in the one-to-one or telephone follow ups
16.2. Diary sheets indicating treatment duration and content.

Secondary outcome measures for trial 2 (observational study) - the following will be assessed at the baseline, after one week and after 26 and 52 weeks:
1. Functional walking, assessed using the Dynamic Gait Index (DGI)

2. MS-specific health-related quality of life, assessed using the 29-item Multiple Sclerosis Impact Scale (MSIS-29) Version 2.0
3. Perceived confidence in performing 16 activities of daily living, assessed using the Activities-Specific Balance Confidence (ABC) scale
4. Symptoms of poor balance and increased anxiety and arousal as a result of vertigo, assessed using the Vertigo Symptom Scale (short form) (VSS)
5. Visually induced dizziness symptoms, assessed using the Situational Characteristic Questionnaire
6. MS-specific fatigue, assessed using the Fatigue Scale for Motor and Cognitive functions (FSMC)
7. Depression and anxiety, assessed using the Hospital Anxiety and Depression Scale (HADS)
8. MS-specific health-related quality of life, assessed using the 29-item Multiple Sclerosis Impact Scale (MSIS-29) Version 2.0

Completion date
30/09/2021

Eligibility

Key inclusion criteria
1. Diagnosis of MS according to revised McDonald criteria
2. Patient determined disease steps 1-5, equivalent to Expanded Disability Status Scale (EDSS) 2-6.5
3. Reporting one of the following at least 4 times per month (questions 1, 7 and 18 on the Vertigo Symptom Scale (VSS)):
3.1. Feeling that things are spinning or moving around
3.2. Feeling of being light-headed, “swimmy” or giddy
3.3. Feeling unsteady and about to lose balance
4. Aged 18 years or older
5. Willing and able to travel to and participate in the 12 face to face sessions should they be allocated to the customised face to face treatment group of the randomised controlled trial, and to commit to undertaking their individualised home-based programme
6. Willing and able to travel to local assessment centres for blinded outcomes assessment

People will be firstly screened for the presence of BPPV. Those with BPPV will be entered into the observational trial (trial 2). The remaining participants will be screened for the presence of central or peripheral vestibulopathy. Those with central and/or peripheral vestibulopathy will be entered into the randomised controlled trial (trial 1).

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Sex

All

Total final enrolment
71

Key exclusion criteria
1. Neurological conditions other than MS as determined from clinical notes
2. Relapsed/received steroid treatment within the last month
3. Currently or recently (within past six months) participated in a VR Program
4. Orthopaedic deficit which may on impact on postural and gait testing or significant pain or weakness (> 4/10 on a numerical rating scale) associated with osteo- or rheumatoid arthritis
5. Dizziness solely explained by other causes (e.g. postural hypotension)
6. Headache or migraine associated with a subjective report of one of the following at least 4 times per month:
6.1. Nausea (feeling sick) or stomach churning
6.2. Vomiting
7. People who have been taking vestibular sedatives specifically for the treatment of vertigo for more than 4 weeks. Vestibular sedatives impair the vestibular compensation process that occurs with rehabilitation (53). Therefore we will ask people on vestibular sedatives to stop their medication for the testing and trial. We will inform people's GP and neurologist about this advice. Medications such as prochlorprazine can also reduce migraines and so there can be a rebound migraine when such medications are withdrawn following chronic use (> 1 month). Therefore people who have been taking vestibular sedatives for more than 1 month will be excluded. If people have been chronically taking vestibular sedatives (> 1 month) and, with approval of their neurologist and/or GP they stop the medication then they will be eligible to take part in the study after a 6 week wash out period.

Date of first enrolment
01/11/2018

Date of final enrolment
30/04/2020

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Plymouth Hospitals NHS Trust
Derriford Road
Plymouth
United Kingdom
PL6 8DH

Study participating centre
Royal Devon and Exeter
Barrack Road
Exeter
United Kingdom
EX2 5DW

Study participating centre
Torbay and South Devon NHS Trust
Lowes Bridge
Torquay
United Kingdom
TQ2 7AA

Study participating centre
National Hospital for Neurology and Neurosurgery; University College Hospitals NHS Foundation Trust
National Hospital for Neurology & Neurosurgery
Queen Square
London
United Kingdom
WC1N 3BG

Sponsor information

Organisation
Plymouth University

ROR
https://ror.org/008n7pv89

Funder(s)

Funder type
Government

Funder Name
Multiple Sclerosis Society (of Great Britain & Northern Ireland); Grant Codes: 71

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study will be stored in a non-publically available repository (https://www.plymouth.ac.uk/research/vermis). The IPD database will be shared of the outcome measures at each time point. All data will be anonymised and stored using a unique code with any “key” linking the code to participants destroyed on study completion. All participants would have provided informed written consent to participate in the study and for their anonymised data to be used for future research purposes. This will be available 1 year after study completion for a period of 5 years. Data is available for other researchers to analyse the quantitative outcome measures.

IPD sharing plan summary

Stored in repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		17/06/2025	18/06/2025	Yes	No
Protocol article	protocol	27/11/2020	30/11/2020	Yes	No
HRA research summary			28/06/2023	No	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes