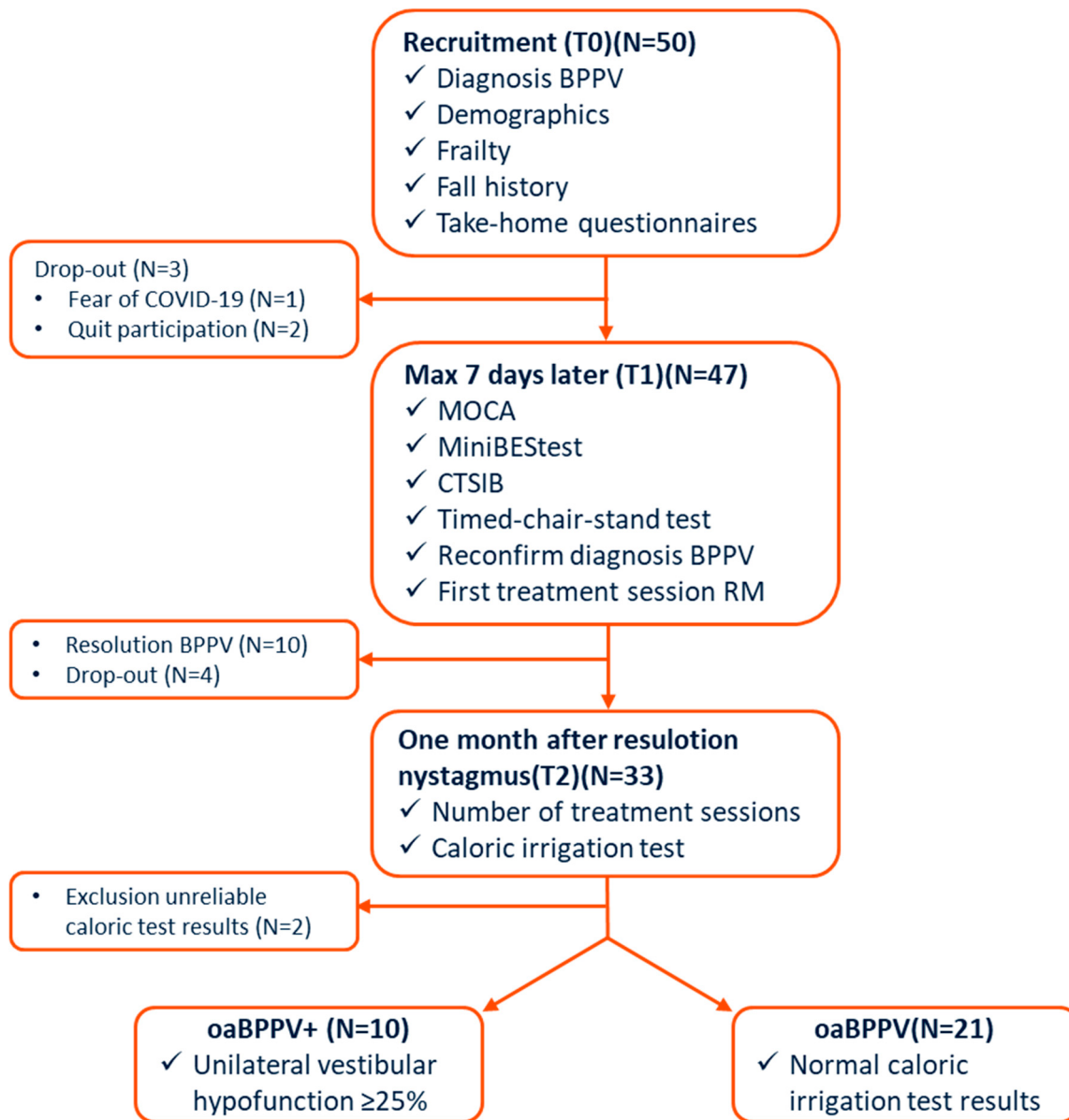


## Supplementary tables and figures

Supplementary figure S1. Flow chart of methods and selection process of participants



Abbreviations: BPPV, benign paroxysmal positioning vertigo; MOCA, montreal cognitive assessment; MiniBESTest, mini balance evaluation system test; CTSIB, Clinical Test of Sensory Interaction on Balance; RM; repositioning maneuver; oaBPPV+, older adults with BPPV and vestibular hypofunction; oaBPPV, older adults with BPPV

**Supplementary table S1.** Checklist of comorbidities

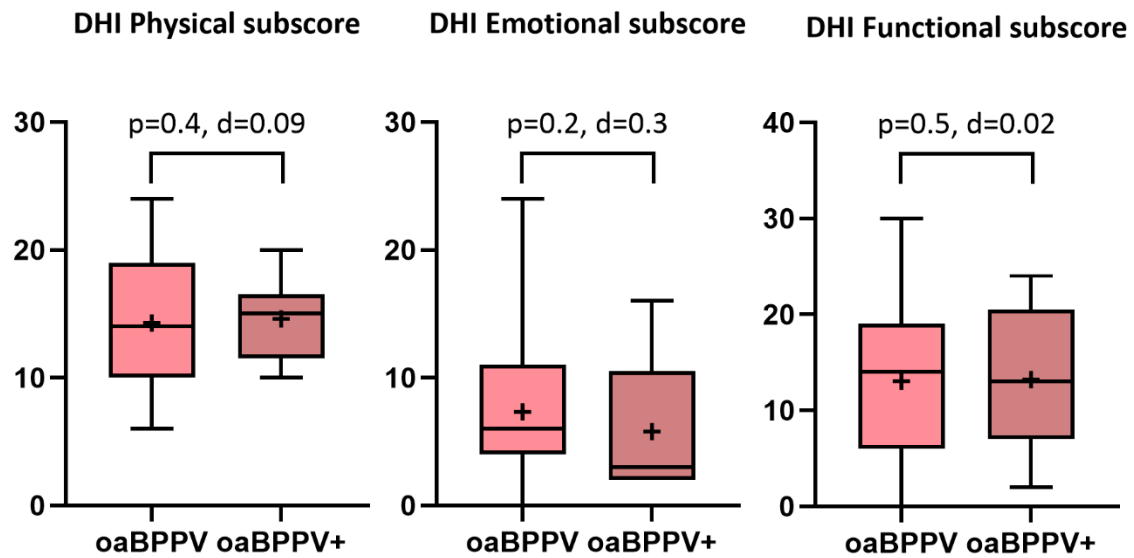
- ☐ Cardiovascular diseases (*Have you ever had a disorder of your heart or blood vessels?*)
- ☐ Cerebrovascular diseases (*Have you ever had a disorder in your brain?*)
- ☐ Diabetes Mellitus (type 1 or 2) (*Have you ever been diagnosed with diabetes?*)
- ☐ Hypertension (*Have you ever been diagnosed with hypertension?*)
- ☐ Hypercholesterolemia (*Do you have elevated cholesterol?*)
- ☐ Vitamin D deficiency (*Have you ever been diagnosed with vitamin d-deficiency?*)
- ☐ Osteoporosis (*Have you ever been diagnosed with osteoporosis?*)
- ☐ Others (*Do you have any other medical disorders?*)

**Supplementary table S2.** Number of repositioning manoeuvres needed for resolution of nystagmus according to BPPV diagnose.

| <b>BPPV diagnose</b> | <b>oaBPPV+</b> | <b>oaBPPV</b> |
|----------------------|----------------|---------------|
| PSCC                 | 2(2.5)         | 3(2)          |
| LSCC geotropic       | 5(9)           | 0             |
| LSCC apogeotropic    | 0              | 1(/)          |

Medians(interquartile range) for number of repositioning maneuvers needed. Abbreviations: BPPV, benign paroxysmal positioning vertigo; PSCC, posterior semicircular canal BPPV; LSCC, lateral semicircular canal BPPV; oaBPPV+, older adults with BPPV and vestibular hypofunction; oaBPPV: older adults with BPPV.

**Supplementary Figure S2.** Results of the sub scores of the Dizziness Handicap Inventory



**Supplementary Figure S2.** Physical, emotional and functional subscores of the Dizziness Handicap Inventory in older adults with BPPV (n=21) and co-existing vestibular hypofunction canal paresis compared to older adults with BPPV (n=10). The boxplots display the medians, interquartile range, and minimum and maximum values, with the '+' symbol representing the mean values. Significant p-values after Holm-Bonferroni correction are indicated with '\*'. A-breviations: oaBPPV+, older adults with BPPV and vestibular hypofunction; oaBPPV, older adults with BPPV; DHI, dizziness handicap inventory;

**Supplementary table S3.** Results of Clinical Test of Sensory Interaction on Balance

| CTSIB                                  | oaBPPV+     | oaBPPV     |
|----------------------------------------|-------------|------------|
| CTSIB1                                 |             |            |
| Area (m <sup>2</sup> /s <sup>4</sup> ) | 0.02(0.03)  | 0.01(0.01) |
| Velocity (m/s)                         | 0.1(0.2)    | 0.1(0.1)   |
| Path (m/s <sup>2</sup> )               | 5.2(1.8)    | 5.2(2.4)   |
| Range (m/s <sup>2</sup> )              | 0.3(0.3)    | 0.3(0.3)   |
| Time (s)                               | 30(0.01)    | 30(0)      |
| CTSIB2                                 |             |            |
| Area (m <sup>2</sup> /s <sup>4</sup> ) | 0(0.02)     | 0.02(0.07) |
| Velocity (m/s)                         | 0.2(0.2)    | 0.1(0.1)   |
| Path (m/s <sup>2</sup> )               | 8.7(6.5)    | 7.2(3.6)   |
| Range (m/s <sup>2</sup> )              | 0.5(0.4)    | 0.4(0.1)   |
| Time (s)                               | 30(0.01)    | 30(0.01)   |
| CTSIB3                                 |             |            |
| Area (m <sup>2</sup> /s <sup>4</sup> ) | 0.4(0.1)    | 0.02(0.02) |
| Velocity (m/s)                         | 0.1(0.2)    | 0.1(0.08)  |
| Path (m/s <sup>2</sup> )               | 7.9(11.4)   | 7.2(4.7)   |
| Range (m/s <sup>2</sup> )              | 0.5(0.7)    | 0.4(0.3)   |
| Time (s)                               | 30(0)       | 30(0.01)   |
| CTSIB4                                 |             |            |
| Area (m <sup>2</sup> /s <sup>4</sup> ) | 0.1(0.5)    | 0.1(0.05)  |
| Velocity (m/s)                         | 0.2(0.09)   | 0.1(0.01)  |
| Path (m/s <sup>2</sup> )               | 7.5(20.3)   | 8.5(2.4)   |
| Range (m/s <sup>2</sup> )              | 0.6(0.1)    | 0.5(0.4)   |
| Time (s)                               | 30(0)       | 30(0)      |
| CTSIB5                                 |             |            |
| Area (m <sup>2</sup> /s <sup>4</sup> ) | 0.7(2.8)    | 0.1(0.2)   |
| Velocity (m/s)                         | 0.2(0.3)    | 0.2(0.2)   |
| Path (m/s <sup>2</sup> )               | 40.6(153.2) | 14.5(10.7) |
| Range (m/s <sup>2</sup> )              | 1.8(2)      | 0.9(0.3)   |
| Time (s)                               | 18(25.3)    | 30(0.01)   |
| CTSIB6                                 |             |            |
| Area (m <sup>2</sup> /s <sup>4</sup> ) | 0.7(1.9)    | 0.1(0.1)   |
| Velocity (m/s)                         | 0.3(0.3)    | 0.3(0.2)   |
| Path (m/s <sup>2</sup> )               | 26.8(52.3)  | 16.1(7.9)  |
| Range (m/s <sup>2</sup> )              | 1.6(3.3)    | 0.1(0.4)   |
| Time (s)                               | 24.120.9)   | 30(0.01)   |

Medians(interquartile range) for CTSIB. Abbreviations: CTSIB, Clinical Test of Sensory Interaction on Balance; CTSIB1, standing on a firm surface with eyes open; CTSIB2, standing on a firm surface with a visual dome; CTSIB3, standing on a firm surface with eyes closed; CTSIB4, standing on a foam surface with eyes open; CTSIB5, standing on foam surface with a visual dome; CTSIB6, standing on a foam surface with eyes closed; oaBPPV+, older adults with BPPV and vestibular hypofunction; oaBPPV: older adults with BPPV.