**Appendix S4. Virtual reality-based exercise group and control group in the included trials.**

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| **Author, Year** | **virtual reality-based balance Group** | **Control Group** | **Duration** |
| Jeon M J, 201917 | ***Frequency:***5 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality training on an unstable;  balance pad: AIREX, Anaheim, CA, USA  program: Moto Cog (Cybermedic, Iksan, Korea):  hand function: a door lock, turning on a gas stove, squeezing, hammering;  ADL: washing, cooking, bathing  ***Frequency:***5 times/week  ***Time:***30 min/day  ***Session:*** a total of 20  ***Type:***  -Physical therapy: stretching exercises, gait training, strengthening exercises;  -Occupational therapy: performing purposeful activities, range of motion exercises, task-based activities | ***Frequency:***5 times/week  ***Time:***30 min/day  ***Type:***  -balance training on over-ground:  static standing, standing on one leg with eyes open, standing on one leg with eyes closed, simple ADLs such as washing, cooking, and bathing;  ***Frequency:***5 times/week  ***Time:***30 min/day  ***Sessions:*** 20  ***Type:***  -Physical therapy: stretching exercises, gait training, strengthening exercises;  -Occupational therapy: performing purposeful activities, range of motion exercises, task-based activities | 4 weeks |
| Barcala L, 201316 | ***Frequency:***5 times/week  ***Time:***30 min/day  ***Session:***2 sessions/week  ***Type:***  -Virtual reality balance training:  platform: visual feedback by the Wii Fit Balance Board;  plataformas (10 min), pesca bajo cero (10 min), la cuerda floja (10 min)  ***Frequency:***5 times/week  ***Time:***60 min/day  ***Session:***2 sessions/week  ***Type:***  -Physical therapy: stretching, joint movement, muscle strengthening, static and dynamic balance training;  -Occupational therapy: training of functional activities | ***Frequency:***5 times/week  ***Time:***60 min/day  ***Session:***2 sessions/week  ***Type:***  -Physical therapy: stretching, joint movement, muscle strengthening, static and dynamic balance training;  -Occupational therapy: training of functional activities | 5 weeks |
| Cho K H, 201215 | ***Frequency:***3 times/week  ***Time:***30 min/day  ***Session:*** a total of 6  ***Type:***  -Virtual reality balance training:  platform: Wii Fit balance board, Nintendo, Japan;  balance bubble, ski slalom, ski jump, soccer heading, table tiling, penguin slide  ***Frequency:***5 times/week  ***Time:***＞60 min/day  ***Type:***  -Physical therapy (30 min);  -Occupational therapy (30 min);  -Speech-language therapy (if appropriate) | ***Frequency:***5 times/week  ***Time:***＞60 min/day  ***Type:***  -Physical therapy (30 min);  -Occupational therapy (30 min);  -Speech-language therapy (if appropriate) | 6 weeks |
| Yu J H, 201619 | ***Frequency:***3 times/week  ***Time:***30 min/day  ***Session:*** a total of 6  ***Type:***  -Virtual reality game:  platform: Wii Fit balance board;  balance bubble, ski slalom, ski jump, soccer heading, table tiling, penguin slide  ***Frequency:***5 times/week  ***Time:***＞60 min/day  ***Type:***  -Physical therapy: neurodevelopmental treatment, proprioceptive neuromuscular facilitation;  -Occupational therapy: upper extremity functional exercise;  -Speech-language therapy | ***Frequency:***5 times/week  ***Time:***＞60 min/day  ***Type:***  -Physical therapy: neurodevelopmental treatment, proprioceptive neuromuscular facilitation;  -Occupational therapy: upper extremity functional exercise | 6 weeks |
| Lee H Y, 201514 | ***Frequency:***3 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality balance training:  platform: Wii Fit balance board (Nintendo, Japan);  sitting posture, knee bend and the other leg knee extend, tightrope walking, penguin teeter-totter seesaw, balance skiing, rolling marble board, balance Wii;  ***Frequency:***5 times/week  ***Time:***60 min/day  ***Type:***  -Task-oriented training:  warm-up;  sit-to-stand from different heights, task training in standing, balance training on an unstable surface, lifting a leg in place, kicking a ball, stair climbing and descending;  cool-down | ***Frequency:***5 times/week  ***Time:***60 min/day  ***Type:***  -Task-oriented training:  warm-up;  sit-to-stand from different heights, task training in standing, balance training on an unstable surface, lifting a leg in place, kicking a ball, stair climbing and descending;  cool-down | 6 weeks |
| Lee H C, 201720 | ***Frequency:***2 times/week  ***Time:***45 min/day  ***Type:***  -Warm-up: stretching to increase soft tissue flexibility and range of motion (15 min);  -Virtual reality balance training:  Kinect Sports, Kinect Adventures, and Your Shape Fitness Evolved packages;  ***Frequency:***2 times/week  ***Time:***45 min/day  ***Type:***  -Standard treatment:  hip flexor and knee extensor strengthening with resistance progression by using weight bags or a Thera-band;  cycle ergometer riding with an increase in speed and resistance;  gait pattern and speed correction through a treadmill and parallel bar;  hand functional training and strategy teaching for feeding, dressing, toileting | ***Frequency:***2 times/week  ***Time:***90 min/day  ***Type:***  -Warm-up: stretching to increase soft tissue flexibility and range of motion (15 min);  -Standard treatment:  hip flexor and knee extensor strengthening with resistance progression by using weight bags or a Thera-band;  cycle ergometer riding with an increase in speed and resistance;  gait pattern and speed correction through a treadmill and parallel bar;  hand functional training and strategy teaching for feeding, dressing, and toileting  -Functional balance exercises (30 min):  facilitate the balance reaction through weight shifting exercises by standing on an uneven surface;  postural transition, including sit-to-stand, sit down, reaching to different directions, stepping to different directions with weight transfer, and bending the trunk forward and side to side;  change in the standing requirement;  increased perception complications through cognition or upper extremity tasks | 6 weeks |
| Lloréns R, 201521 | ***Frequency:***5 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality balance training:  audiovisual feedback while performing a stepping task;  ***Frequency:***5 times/week  ***Time:***30 min/day  ***Type:***  -Conventional physiotherapy:  static standing exercises in Romberg position, tandem stance, single  stance using verbal, visual, and perceptual;  task-specific reaching exercises;  stepping tasks to increase weight transfer and improve stepping strategies;  static and dynamic balance exercises including arm activities, obstacle course, indoor and outdoor walking, stair climbing | ***Frequency:***5 times/week  ***Time:***60 min/day  ***Type:***  -Conventional physiotherapy:  static standing exercises in Romberg position, tandem stance, single  stance using verbal, visual, and perceptual;  task-specific reaching exercises;  stepping tasks to increase weight transfer and improve stepping strategies;  static and dynamic balance exercises including arm activities, obstacle course, indoor and outdoor walking, stair climbing | 4 weeks |
| Marques-Sule E, 202122 | ***Frequency:***2 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality balance training:  lower limb balance training: heading, ski slalom, tilt table, tightrope tension, downstream, sub-zero fishing (15 min)  upper limb training: bowling, golf, and tennis games (15 min)  ***Frequency:***2 times/week  ***Time:***120 min/day  ***Type:***  -Conventional physiotherapy:  warm-up (stationary bicycle, 15 min);  mobility and strengthening lower limb exercises in supine position (3 series, 15 repetitions);  active-assisted/passive lower and upper limb kinesiotherapy (3 series, 15 repetitions);  upper limb strengthening exercises using weights and elastic bands (3 series, 15 repetitions);  balance, stability, and coordination exercises (3 series, 15 repetitions);  walking re-education exercises with emphasis in weight transfer, swing phase, step and stride length, and training with obstacles (10 min);  cool-down stretching and mobilizations of lower and upper limbs adapted to characteristics of each participant (10 min) | ***Frequency:***2 times/week  ***Time:***120 min/day  ***Type:***  -Conventional physiotherapy:  warm-up (stationary bicycle, 15 min);  mobility and strengthening lower limb exercises in supine position (3 series, 15 repetitions);  active-assisted/passive lower and upper limb kinesiotherapy (3 series, 15 repetitions);  upper limb strengthening exercises using weights and elastic bands (3 series, 15 repetitions);  balance, stability, and coordination exercises (3 series, 15 repetitions);  walking re-education exercises with emphasis in weight transfer, swing phase, step and stride length, and training with obstacles (10 min);  cool-down stretching and mobilizations of lower and upper limbs adapted to characteristics of each participant (10 min) | 4 weeks |
| Yatar G I, 201523 | ***Frequency:***3 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality balance training:  soccer heading, ski slalom, balance bubble;  ***Frequency:***2 times/week  ***Time:***30 min/day  ***Type:***  -Neurodevelopmental training:  shoulder mobilization, stretching, goal-directed movements;  strengthening trunk muscles, reaching activities, rotational trunk movements, bridging activities;  ankle mobilization, stretching, goal-directed movements | ***Frequency:***3 times/week  ***Time:***30 min/day  ***Type:***  -Progressive balance training:  head rotation and flexion, trunk rotation, reaching actions, weight shifting, stepping, single leg support, standing on one leg;  ***Frequency:***2 times/week  ***Time:***30 min/day  ***Type:***  -Neurodevelopmental training: | 4 weeks |
| Song G B, 201524 | ***Frequency:***5 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality balance training:  10-pin bowling, skiing, golf, ground walking, walking over obstacles, climbing stairs; | ***Frequency:***5 times/week  ***Time:***30 min/day  ***Type:***  -Ergometer bicycle training | 8 weeks |
| Choi D, 201825 | ***Frequency:***3 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality balance training:  platform: Wii Balance Board System (Nintendo Co. Ltd, Kyoto, Japan);  first stage (1-2 weeks): tightrope walking, soccer heading;  second stage (3-4 weeks): penguin slide, ski slalom;  third stage (5-6 weeks): snowboard slalom, table tilt;  ***Frequency:***5 times/week  ***Time:***90 min/day  ***Type:***  -Conventional physical;  -Occupational therapy | ***Frequency:***3 times/week  ***Time:***30 min/day  ***Type:***  -General balance training:  first stage (1-2 weeks): transfer body weight in the left and right directions while standing in front of the mirror;  second stage (3-4 weeks): forward and backward weight shifting in addition to left and right weight shifting;  third stage (5-6 weeks): weight shifting by placing a square plate on top of the head  ***Frequency:***5 times/week  ***Time:***90 min/day  ***Type:***  -Conventional physical;  -Occupational therapy | 6 weeks |
| Morone G, 201418 | ***Frequency:***3 times/week  ***Time:***20 min/day  ***Type:***  -Virtual reality balance training:  hula hoop, bubble blower, sky slalom  ***Frequency:***3 times/week  ***Time:***20 min/day  ***Type:***  -Standard physical therapy:  trunk stabilization, weight transfer to the paretic leg, exercise with Freeman board for balance, proprioception | ***Frequency:***3 times/week  ***Time:***20 min/day  ***Type:***  -Standard physical therapy:  trunk stabilization, weight transfer to the paretic leg, exercise with Freeman board for balance, proprioception | 4 weeks |
| Kim J H, 200926 | ***Frequency:***4 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality balance training:  stepping up/down, sharkbait, snowboard games  ***Frequency:***4 times/week  ***Time:***40 min/day  ***Type:***  -Conventional physical therapy:  rhythmic stabilization, approximation exercises on the affected hip joint and musculature | ***Frequency:***4 times/week  ***Time:***40 min/day  ***Type:***  -Conventional physical therapy:  rhythmic stabilization, approximation exercises on the affected hip joint and musculature | 4 weeks |
| de Rooij IJM, 2021 | ***Frequency:***2 times/week  ***Time:***30 min/day  ***Type:***  -Virtual reality balance training:  reactive balance, maneuverability, dual tasks | ***Frequency:***2 times/week  ***Time:***25-30 min/day  ***Type:***  -conventional treadmill training (10–15 min)  functional gait exercises (15 min) | 6 weeks |

ADL: activities of daily living.