**Appendix 1: Eligibility Criteria**

**Author**: Douris et al.

**Title**: The Effect of Land and Aquatic Exercise on Balance Scores in Older Adults

**Journal**: Journal of Geriatric Physical Therapy

**Year:** 2003

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 | √ |  |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 | √ |  |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 | √ |  |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 | √ |  |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  | √ |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 | √ |  |
| 1. Strengthening exercises (LL/UL)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 | √ |  |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 |  | √ |
| 1. Balance
 | √ |  |

**Author**: Chu et al.

**Title**: A randomized controlled trial of water-based exercise for cardiovascular fitness in individuals with chronic stroke

**Journal**: Archives of Physical Medicine and Rehabilitation

**Year**: 2004

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  | √ |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 | √ |  |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  | √ |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 |  | √ |
| 1. Strengthening exercises (Trunk/LL/UL)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 | √ |  |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 | √ |  |

**Author:** Noh et al.

**Title:** The effect of aquatic therapy on postural balance and muscle strength in stroke patients - A randomized controlled pilot trial

**Journal:** Clinical Rehabilitation

**Year:** 2008

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 |  |  |
| Study Characteristics |
| 1. Full text
 |  |  |
| 1. Written in English language
 |  |  |
| Type of participants (all)  |
| 1. Stroke patients
 |  |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  |  |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  |  |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 |  |  |
| 1. Strengthening exercises (Trunk/LL/UL)
 |  |  |
| 1. Stretching (LL/ UL)
 |  |  |
| 1. Joints ROM exercises
 |  |  |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 |  |  |
| 1. Balance
 |  |  |

**Author**: Lee et al.

**Title**: Effects on Static and Dynamic Balance of Task-Oriented Training for Patients in Water or on Land

**Journal**: Journal of Physical Therapy Science

**Year**: 2010

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  | √ |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 | √ |  |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  | √ |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 | √ |  |
| 1. Balance training exercises
 |  | √ |
| 1. Strengthening exercises (Trunk/LL/UL)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 |  | √ |
| 1. Balance
 | √ |  |

**Author**: Park and Roh

**Title**: Postural Balance of Stroke Patients in Aquatic and Land Environments

**Journal**: Journal of Physical Therapy Science

**Year**: 2011

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 | √ |  |
| 1. Underwater balance training exercises
 | √ |  |
| 1. Underwater gait training (including backward gait training)
 | √ |  |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 | √ |  |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 | √ |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 | √ |  |
| 1. Strengthening exercises (Trunk/LL/UL)
 | √ |  |
| 1. Stretching (LL/ UL)
 | √ |  |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 | √ |  |
| Type of outcome |
| 1. Gait
 |  | √ |
| 1. Balance
 | √ |  |

**Author**: Jung et al.

**Title**: The Effect of Obstacle Training in Water on Static Balance of Chronic Stroke Patients

**Journal**: Journal of Physical Therapy Science

**Year**: 2014

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  | √ |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 | √ |  |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  | √ |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 |  | √ |
| 1. Strengthening exercises (Trunk/LL/UL)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 | √ |  |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 |  | √ |
| 1. Balance
 | √ |  |

**Author**: Park et al.

**Title**: A comparative study of the effects of trunk exercise program in aquatic and land-based therapy on gait in hemiplegic stroke patients

**Journal**: Journal of Physical Therapy Science

**Year:** 2016

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 | √ |  |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  | √ |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 | √ |  |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 | √ |  |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 | √ |  |
| 1. Overground gait training (including backward gait training & parallel bar training)
 | √ |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 | √ |  |
| 1. Strengthening exercises (LL/UL)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 | √ |  |
| 1. Arm function program
 | √ |  |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 |  | √ |

**Author**: Saharan et al.

**Title**: Effects of aquatic and land –Based exercise on balance and gait in post stroke patient

**Journal**: International Journal of Current Research

**Year**: 2016

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 | √ |  |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 | √ |  |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 | √ |  |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 | √ |  |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  | √ |
| 1. Anti-gravity/ overground treadmill gait training
 | √ |  |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 | √ |  |
| 1. Strengthening exercises (LL/UL)
 | √ |  |
| 1. Stretching (LL/ UL)
 | √ |  |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 | √ |  |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 | √ |  |

**Author**: Zhu et al.

**Title**: Hydrotherapy vs. conventional land-based exercise for improving gait and balance after stroke: A randomized controlled trial

**Journal**: Clinical Rehabilitation

**Year**: 2016

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 | √ |  |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 | √ |  |
| 1. Underwater gait training (including backward gait training)
 | √ |  |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 | √ |  |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 | √ |  |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 | √ |  |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 | √ |  |
| 1. Overground gait training (including backward gait training & parallel bar training)
 | √ |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 | √ |  |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 | √ |  |
| 1. Strengthening exercises (LL/UL/Trunk)
 | √ |  |
| 1. Stretching (LL/ UL)
 | √ |  |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 | √ |  |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 | √ |  |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 | √ |  |

**Author:** Chan et al.

**Title:** The effect of water-based exercises on balance in persons post-stroke: a randomized controlled trial

**Journal:** Topics in Stroke Rehabilitation

**Year:** 2017

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 |  |  |
| Study Characteristics |
| 1. Full text
 |  |  |
| 1. Written in English language
 |  |  |
| Type of participants (all) |
| 1. Stroke patients
 |  |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  |  |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  |  |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 |  |  |
| 1. Strengthening exercises (Trunk/LL/UL)
 |  |  |
| 1. Stretching (LL/ UL)
 |  |  |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  |  |
| Type of outcome |
| 1. Gait
 |  |  |
| 1. Balance
 |  |  |

**Author**: Kum and Shin

**Title**: Effect of backward gait training using an underwater treadmill on muscle strength, proprioception and gait ability in persons with stroke

**Journal**: Physical Therapy Rehabilitation Science

**Year**: 2017

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 | √ |  |
| 1. Aquatic Proprioceptive exercise program
 | √ |  |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 | √ |  |
| 1. Underwater gait training (including backward gait training)
 | √ |  |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 | √ |  |
| 1. Anti-gravity/ overground treadmill gait training
 | √ |  |
| 1. Proprioceptive exercise program
 | √ |  |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 | √ |  |
| 1. Strengthening exercises (LL/UL/ Trunk)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 |  | √ |

**Author:** Park and Chung

**Title:** A Comparison of Underwater Gait Training with Additional Weight Application and Over-ground Gait Training to Improve Balance and Lower Extremity Strength in Persons with Stroke

**Journal:** The Journal of Korean Physical Therapy

**Year:** 2017

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 |  |  |
| Study Characteristics |
| 1. Full text
 |  |  |
| 1. Written in English language
 |  |  |
| Type of participants (all) |
| 1. Stroke patients
 |  |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  | √ |
| 1. Underwater gait training (including backward gait training)
 |  |  |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 |  | √ |
| 1. Strengthening exercises (Trunk/LL/UL)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 | √ |  |

**Author**: Lee et al.

**Title**: The Effects of a Motorized Aquatic Treadmill Exercise Program on Muscle Strength, Cardiorespiratory Fitness, and Clinical Function in Subacute Stroke Patients: A Randomized Controlled Pilot Trial

**Journal**: American Journal of Physical Medicine & Rehabilitation

**Year**: 2018

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 | √ |  |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  | √ |
| 1. Underwater gait training (including backward gait training)
 |  | √ |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 | √ |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 | √ |  |
| 1. Strengthening exercises (Trunk/LL/UL)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 | √ |  |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 | √ |  |
| Type of outcome |
| 1. Gait
 |  | √ |
| 1. Balance
 | √ |  |

**Author**: Park and Chung

**Title**: Comparison of Aquatic Treadmill and Anti-Gravity Treadmill Gait Training to Improve Balance and Gait Abilities in Stroke Patients

**Journal**: The Journal of Korean Physical Therapy

**Year**: 2018

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 | √ |  |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  | √ |
| 1. Underwater gait training (including backward gait training)
 | √ |  |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 | √ |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 |  | √ |
| 1. Strengthening exercises (LL/UL/ Trunk)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 | √ |  |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 | √ |  |

**Author**: Kim and Chung

**Title**: Effect of Underwater Gait Training with a Progressive Increase in Speed on Balance, Gait, and Endurance in Stroke Patients

**Journal**: The Journal of Korean Physical Therapy

**Year**: 2019

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 |  |  |
| Study Characteristics |
| 1. Full text
 |  |  |
| 1. Written in English language
 |  |  |
| Type of participants (all) |
| 1. Stroke patients
 |  |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 |  | √ |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 |  | √ |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 |  | √ |
| 1. Underwater gait training (including backward gait training)
 |  |  |
| 1. Aquatic dual-task training
 |  | √ |
| 1. Task-oriented training in water
 |  | √ |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 |  | √ |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 |  |  |
| 1. Anti-gravity/ overground treadmill gait training
 |  | √ |
| 1. Proprioceptive exercise program
 |  | √ |
| 1. Task-oriented training
 |  | √ |
| 1. Balance training exercises
 |  | √ |
| 1. Strengthening exercises (Trunk/LL/UL)
 |  | √ |
| 1. Stretching (LL/ UL)
 |  | √ |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 |  | √ |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 |  | √ |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 | √ |  |

**Author**: Saleh et al.

**Title**: Effect of aquatic versus land motor dual task training on balance and gait of patients with chronic stroke: A randomized controlled trial

**Journal**: Neuro Rehabilitation

**Year**: 2019

|  |  |  |
| --- | --- | --- |
| Type of study | Yes | No |
| 1. RCT (including randomized controlled pilot trial)
 | √ |  |
| Study Characteristics |
| 1. Full text
 | √ |  |
| 1. Written in English language
 | √ |  |
| Type of participants (all) |
| 1. Stroke patients
 | √ |  |
| Type of intervention (water-based therapy) |
| 1. Aquatic trunk exercise program
 | √ |  |
| 1. Aquatic treadmill training program (including motorized treadmill program)
 |  | √ |
| 1. Aquatic Proprioceptive exercise program
 | √ |  |
| 1. Underwater joints ROM exercises
 |  | √ |
| 1. Underwater balance training exercises
 | √ |  |
| 1. Underwater gait training (including backward gait training)
 | √ |  |
| 1. Aquatic dual-task training
 | √ |  |
| 1. Task-oriented training in water
 | √ |  |
| 1. Underwater obstacle training
 |  | √ |
| 1. Postural control training
 |  | √ |
| 1. Aquatic cardiovascular fitness training (other than treadmill training)
 |  | √ |
| 1. Other underwater exercises (strengthening, stretching, etc..)
 | √ |  |
| Type of comparison (land-based therapy) |
| 1. Trunk exercise program
 |  | √ |
| 1. Overground gait training (including backward gait training & parallel bar training)
 | √ |  |
| 1. Anti-gravity/ overground treadmill gait training
 | √ |  |
| 1. Proprioceptive exercise program
 | √ |  |
| 1. Task-oriented training
 | √ |  |
| 1. Balance training exercises
 | √ |  |
| 1. Strengthening exercises (LL/UL/ Trunk)
 |  | √ |
| 1. Stretching (LL/ UL)
 | √ |  |
| 1. Joints ROM exercises
 |  | √ |
| 1. Postural control training
 | √ |  |
| 1. Obstacle training
 |  | √ |
| 1. Dual-task training
 | √ |  |
| 1. Cardiovascular fitness training (other than treadmill)
 |  | √ |
| 1. Arm function program
 | √ |  |
| 1. Other land-based exercises
 |  | √ |
| Type of outcome |
| 1. Gait
 | √ |  |
| 1. Balance
 | √ |  |

**Appendix 2: Search Terms**

|  |  |  |  |
| --- | --- | --- | --- |
| **P** | **I** | **C** | **O** |
| **Stroke** | **Hydrotherap\*** | **Land-based therap\*** | **Balance** |
| Cerebrovascular accident | Aqua\* | Strength\* exercise | **Equilibrium** |
| CVA | Whirlpool Bath | Resist\* exercises | **Stability** |
| Cerebrovascular Apoplexy | Water-based rehabilitat\* | Conventional therapy | **Postur\* control** |
| Apoplexy | Hydrokinesitherapy | Treadmill training | **Propriocept\*** |
| Cerebrovascular Stroke |  |  | **Gait**  |
| Cerebral Stroke |  |  | **Walk\*** |
| Brain Vascular Accident |  |  | Ambulation |
| HemorrhagicStroke |  |  | **Locomotion** |
| Combine terms within each column by using the Boolean operator ‘OR’ |
| Combine columns total terms using the Boolean operator ‘AND’ |

## **Appendix 3: Database-specific Search Strategies**

**Search Strategy: CINAHL**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search Yield |
| #S1 | Stroke OR Cerebral Stroke OR CVA OR Cerebrovascular Accident OR Apoplexy OR Cerebrovascular Apoplexy OR Cerebrovascular Stroke OR Brain Vascular Accident OR Hemorrhagic Stroke  | 509,093 |
| #S2 |

|  |
| --- |
| Water-based rehabilitat\* OR Hydrotherap\* OR Aqua\* OR Whirlpool Bath OR Hydrokinesitherapy  |

 | 437,013 |
| #S3 |

|  |  |
| --- | --- |
| Treadmill training OR Land-based therap\* OR Strength\* exercise OR Resist\* **exercises** OR Conventional therapy  |  |

 | 75,685 |
| #S4 |

|  |  |
| --- | --- |
| Balance OR Propriocept\* OR Postur\* control OR Stability OR Equilibrium  |  |

 | 2,427,458 |
| #S5 | Walk\* OR Gait OR Locomotion OR Ambulation  | 571,625 |
| #S6 | S1 AND S2 AND S3 AND S4 AND S5 | 8 |

**Search Strategy: EBSCOhost** (all databases except MEDLINE & CINAHL- searched previously)

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search yield |
| #1 | Stroke OR Cerebrovascular accident OR CVA OR Cerebrovascular Apoplexy OR Apoplexy OR Cerebrovascular Stroke OR Cerebral Stroke OR Brain Vascular Accident OR Hemorrhagic Stroke | 218,855 |
| #2 | Hydrotherap\* OR Aqua\* OR Whirlpool Bath OR Water-based rehabilitat\* OR Hydrokinesitherapy | 255,789 |
| #3 | Land-based therap\* OR Strength\* exercise OR Resist\* exercises OR Conventional therapy OR Treadmill training | 31,768 |
| #4 | Balance OR Equilibrium OR Stability OR Postur\* Control OR Propriocept\* OR Walk\* OR Gait OR Ambulation OR Locomotion | 2,013,939 |
| #5 | #1 AND #2 AND #3 AND #4 | 7 |
| #6 | #1 AND #2 AND #3 AND #4 **Filters: Full Text** | 3 |

**Search Strategy: MEDLINE**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search yield |
| S1 | Stroke OR Cerebrovascular accident OR CVA OR Cerebrovascular Apoplexy OR Apoplexy OR Cerebrovascular Stroke OR Cerebral Stroke OR Brain Vascular Accident OR Hemorrhagic Stroke | 330,576 |
| S2 | Hydrotherap\* OR Aqua\* OR Whirlpool Bath OR Water-based rehabilitat\* OR Hydrokinesitherapy | 182,902 |
| S3 | Land-based therap\* OR Strength\* exercise OR Resist\* exercises OR Conventional therapy OR Treadmill training | 47,444 |
| S4 | Balance OR Equilibrium OR Stability OR Postur\* Control OR Propriocept\* OR Walk\* OR Gait OR Ambulation OR Locomotion | 1,110,342 |
| S5 | S1 AND S2 AND S3 AND S4 | 16 |
| S6 | S1 AND S2 AND S3 AND S4 **Publication type: Randomized controlled trial** | 6 |

**Search Strategy: OTseeker**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search Yield |
| S1 | Hydrotherapy AND Land-based therapy AND Balance AND stroke | 1 |

**Search Strategy: Ovid**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search Yield |
| #S1 | What is the effect of water-based therapy for stroke patients on gait and balance compared to land-based therapy? | 100 |
| #S2 | What is the effect of water-based therapy for stroke patients on gait and balance compared to land-based therapy? **Filters: Full Text** | 14 |

**Search Strategy: PEDro**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search yield |
| S1 | Hydrotherapy for stroke | 19 |
| S2 | Water-based therapy for stroke | 4 |
| S3 | What is the effect of water-based therapy for stroke patients on walking and balance compared to land-based therapy | 0 |
| S4 | Whirlpool bath for stroke | 0 |
| S5 | Whirlpool bath for CVA | 0 |
| S6 | Whirlpool bath for cerebrovascular accident | 0 |
| S7 | Water-based rehabilitation for stroke | 5 |
| S8 | Water-based rehabilitation for CVA | 0 |
| S9 | Water-based rehabilitation for cerebrovascular accident | 0 |
| S10 | Hydrokinesitherapy for stroke | 0 |
| S11 | Hydrokinesitherapy for CVA | 0 |
| S12 | Hydrokinesitherapy for cerebrovascular accident | 0 |
| S13 | Stroke,balance and gait | 309 |

**Search Strategy: PubMed**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search Yield |
| #1 | ((((((((Stroke) OR Cerebrovascular accident) OR CVA) OR Cerebrovascular Apoplexy) OR Apoplexy) OR Cerebrovascular Stroke) OR Cerebral Stroke) OR Brain Vascular Accident) OR Hemorrhagic Stroke **Sort by: Best Match (All Fields)** | 393,944 |
| #2 | ((((Hydrotherap\*) OR Aqua\*) OR Whirlpool Bath) OR Water-based rehabilitat\*) OR Hydrokinesitherapy **Sort by: Best Match (All Fields)** | 54,523 |
| #3 | ((((Land-based therap\*) OR Strength\* exercise) OR Resist\* exercises) OR Conventional therapy) OR Treadmill training **Sort by: Best Match (All Fields)** | 261,722 |
| #4 | ((((((((Balance) OR Equilibrium) OR Stability) OR Postur\* control) OR Propriocept\*) OR Walk\*) OR Gait) OR Ambulation) OR Locomotion **Sort by: Best Match (All Fields)** | 592,732 |
| #5 | Search (((#1) AND #2) AND #3) AND #4 **Sort by: Best Match (All Fields)** | 17 |
| #6 | (((#1) AND #2) AND #3) AND #4 **Sort by: Best Match (All Fields) Filters: Full text** | 17 |
| #7 | (((#1) AND #2) AND #3) AND #4 **Sort by: Best Match Filters: Clinical Trial; Full text** | 7 |

## **Appendix 4: Other Sources Search Strategies**

**Search Strategy: Google scholar**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Results |
| S1(without filters) | What is the effect of water-based therapy for stroke patients on gait and balance compared to land-based therapy? | 568  |

**Search Strategy: Journal of Physical Therapy Science**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search Yield |
| 1 | The effect of water-based therapy for stroke patients on gait and balance compared to land-based therapy (Full Text) | 23 |

**Searching database: The Journal of Korean Physical Therapy (JKPT)**

|  |  |  |
| --- | --- | --- |
| Search ID | Search | Search Yield |
| S1 | Aqua therapy for stroke | 1 |
| S2 | Water-based therapy for stroke | 2 |
| S3 | What is the effect of water-based therapy for stroke patients on walking and balance compared to land-based therapy | 0 |
| S4 | Whirlpool bath for stroke | 0 |
| S5 | Whirlpool bath for CVA | 0 |
| S6 | Whirlpool bath for cerebrovascular accident | 0 |
| S7 | Water-based rehabilitation for stroke | 1 |
| S8 | Water-based rehabilitation for CVA | 0 |
| S9 | Water-based rehabilitation for cerebrovascular accident | 0 |
| S10 | Hydrokinesitherapy for stroke | 0 |
| S11 | Hydrokinesitherapy for CVA | 0 |
| S12 | Hydrokinesitherapy for cerebrovascular accident | 0 |
| S13 | Stroke,balance and gait | 27 |

**Appendix 5: Study Details**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Authors*** | ***Aim*** | ***Type of study*** | ***QA score*** | ***Patients*** | ***Follow-Up*** | ***Outcome Measure/s*** | ***Results*** |
| **Douris et al.** | To determine if aquatic exercise was more effective than land-based exercise when training balance | RCT | 7/10 | 12 | 11 (90%) | **Balance**: Berg Balance Scale (BBS) | Lower body activity as described in either medium is effective in increasing balance outcomes as determined using the Berg Balance Scale (BBS) (Aquatic therapy> land-based therapy) |
| **Chu et al.** | To evaluate the effect of an 8-week water-based exercise program over an upper extremity function program to increase cardiovascular fitness within a community setting for individuals with stroke. | RCT | 8/10 | 27 | 12 (44%) | **Balance**: Berg Balance Score**Gait**: Self-selected gait speed (m/s) over 8-meter walkway & muscle strength of paretic and non-paretic knee and hip joints (KinCom strength dynamometere) | Success = >50% improvement in gait and balance (water-based therapy> land-based therapy) |
| **Noh et al.** | To evaluate the effect of an aquatic therapy programme designed to increase balance in stroke survivors. | RCT | 8/10 | 25 | 20 (80%) | **Balance**: Berg Balance Scale (BBS) & mtd-Balance (mtd-Systems Inc., Neunburg v. Wald, Germany))**Gait:** Modified Motor Assessment Scale | Significant improvements in BBS (aquatic therapy> land-based therapy)No changes was shown in gait. |
| ***Authors*** | ***Aim*** | ***Type of study*** | ***QA score*** | ***Patients*** | ***Follow-Up*** | ***Outcome Measure/s*** | ***Results*** |
| **Lee et al.** | To give task-oriented training to stroke patient in water and on land and compare their static balance and dynamic balance. | RCT | 9/10 | 34 | 34 (100%) | **Balance**: Good Balance System | Success = >50% improvement in static and dynamic balance (water-based therapy>land-based therapy) |
| **Park and Roh** | To investigate the effect of an aquatic environment on the balance of stroke patients compared to a land environment. | RCT | 6/10 | 46 | 46 (100%) | **Balance**: Good Balance System | Success => 50% improvement in static balance (water-based> land-based) |
| **Jung et al.** | To evaluate the effects of water and land-based obstacle training on static balance of chronic stroke patients. | RCT | 6/10 | 30 | 30 (100%) | **Balance**: Good balance system | Success = >50% improvement in static balance (water-based> land-based) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Authors*** | ***Aim***  | ***Type of study*** | ***QA score*** | ***Patients*** | ***Follow-Up*** | ***Outcome Measure/s*** | ***Results*** |
| **Park et al.** | To compare the effects of aquatic and land-based trunk exercise program on gait in stroke patients. | RCT | 9/10 | 28 | 28 (100%) |  **Gait**: motor-driven treadmill | Success= >50% improvement in gait parameters (aquatic therapy = land-based therapy) |
| **Saharan et al.** | To find out the difference and importance of aquatic and land-based exercise on Balance and Gait outcomes in people post-stroke. | RCT | 8/10 | 5 | 4(80%) | **Balance**: Biodex Balance Equipment**Gait:** Biodex Gait Trainer | Success=> 50% Improvement in gait and balance (aquatic therapy= land-based therapy) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Authors*** | ***Aim*** | ***Type of study*** | ***QA score*** | ***Patients*** | ***Follow-Up*** | ***Outcome Measure/s*** | ***Results*** |
| **Zhu et al.** | To investigate the effects of hydrotherapy on walking ability and balance in patients with chronic stroke. | RCT | 9/10 | 28 | 28 (100%) | **Balance:** Berg Balance Scale, Functional Reach Test, & Timed Up and Go test**Gait:** 2-minute walk test | Success= >50% improvement in balance and gait (hydrotherapy> land-based therapy) |
| **Chan et al.** | To examine the effect of water-based exercises compared to land-based exercises on the balance of people with sub-acute stroke. | RCT | 6/10 | 32 | 25(78%) | **Balance**: Berg Balance Scale (BBS), Community Balance and Mobility Test (CBM), & Timed Up and Go Test (TUG)**Gait**:2-minute walk test (2MWT) | Success=>50% improvement in gait (2MWT) and balance (BBS & CBM) - No change in TUG) (water-based> land-based) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Authors*** | ***Aim***  | ***Type of study*** | ***QA score*** | ***Patients*** | ***Follow-Up*** | ***Outcome Measure/s*** | ***Results*** |
| **Kum and Shin** | To investigate the effects of backward treadmill gait training between underwater and ground environments on strength, proprioception, and walking ability in persons with stroke. | RCT | 10/10 | 28 | 28 (100%) | **Gait:** Figure-of-Eight walk test & Functional gait assessment | Improvement of gait velocity and gait symmetry in underwater treadmill training group and backward treadmill training group (equal effect) |
| **Park and Chung** | To compare additionally applied weight underwater gait training and over-ground gait training to improve balance and lower extremity strength in stroke patients. | RCT | 7/10 | 19 | 19 (100%) | **Balance**: Berg Balance Scale (BBS) & Timed Up and Go Test (TUG)**Gait:** Medical Research Council | All of the outcome measures used showed a significant improvement in balance (underwater > over-ground). |
| ***Authors*** | ***Aim***  | ***Type of study*** | ***QA score*** | ***Patients*** | ***Follow-Up*** | ***Outcome Measure/s*** | ***Results*** |
| **Lee et al.** | To assess whether the effects of a motorized aquatic treadmill exercise program improve the isometric strength of the knee muscles, cardiorespiratory fitness, arterial stiffness, motor function, balance, functional outcomes, and quality of life in subacute stroke patients. | RCT | 9/10 | 37 | 32(86.5%) | **Balance**: Berg Balance Scale  | Success= >50% improvement in functional outcome (balance) (water-based therapy> land-based therapy) |
| **Park and Chung** | To compare aquatic treadmill and anti-gravity treadmill gait training to improve balance and gait abilities in stroke patients. | RCT | 8/10 | 27 | 27 (100%) | **Balance:** Timed Up and Go test (TUG) & Berg Balance Scale**Gait:** 10 Meter Walk Test (10MWT) | Improvement in gait and balance (aquatic treadmill group= anti-gravity treadmill group)  |
| ***Authors*** | ***Aim*** | ***Type of study*** | ***QA score*** | ***Patients*** | ***Follow-Up*** | ***Outcome Measure/s*** | ***Results*** |
| **Kim and Chung** | To investigate the effect of progressive speed increase during underwater gait training on stroke patients’ balance, gait, and endurance, as well as to compare the effects of underwater gait training and land gait training. | RCT | 4/10 | 28 | 28 (100%) | **Balance**: Berg Balance Scale (BBS)**Gait**: 6-Minute Walk Test (6MWT) | Improvement in gait and balance (underwater> land)  |
| **Saleh et al.** | To compare the effect of aquatic versus land motor dual task training on balance and gait of patients with chronic stroke. | RCT | 7/10 | 50 | 50 (100%) | **Balance:** Biodex Balance System**Gait:** Biodex Gait Trainer | Aquatic motor dual task training is more effective in improving balance and gait abilities of patients with chronic stroke than land motor dual task training |

**Appendix 6: Participants’ Information**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***First author et al. (date)*** | ***Age*** | ***Number at the beginning of trial*** | ***Number at outcome assessment*** | ***Retention (%)*** |
|  **Douris et al. (2003)** | 68-91 | 12 | 11 | 91% |
| **Chu et al. (2004)** | 51-72 | 27 | 12 | 44.4% |
| **Noh et al. (2008)** | 61-66 | 25 | 20 | 20% |
| **Lee et al. (2010)** | 48-75 | 34 | 34 | 100% |
| **Park and Roh (2011)**  | 46-62 | 46 | 46 | 100% |
| **Jung et al. (2014)** | 51-61 | 30 | 30 | 100% |
| **Park et al. (2016)** | 33-52 | 28 | 28 | 100% |
| **Saharan et al. (2016)** | 45-65 | 5 | 4 | 80% |
| **Zhu et al. (2016)**  | 49-66 | 28 | 28 | 100% |
| **Chan et al. (2017)** | 64-66 | 32 | 25 | 22% |
| **Kum and Shin (2017)** | 39-69 | 28 | 28 | 100% |
|  **Park and Chung (2017)** |

|  |
| --- |
|  41-73 |

 | 19 | 19 | 100% |
| **Lee et al. (2018)** | 43-75 | 37 | 32 | 87% |
| **Park and Chung (2018)** | 49- 83 | 27 | 27 | 100% |
| **Kim and Chung (2019)** |

|  |
| --- |
|  38-68 |

 | 28 | 28 | 100% |
| **Saleh et al. (2019)** | 47-51 | 50 | 50 | 100% |

**Appendix 7: Intervention Details**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Water-based Therapy*** | ***Length of intervention period*** | ***Number of sessions during period*** | ***Duration of sessions*** | ***Temperature of water*** | ***Supervised/ Unsupervised*** | ***Description of components of intervention eg. stretching, strengthening*** |
|  **Douris et al. (2003)** | 6 weeks | 12 (2/week) | 20-30 minutes/ session | 33 °C | Supervised | -Gait forward Marching forward -Sidestepping without crossing legs-Tandem gait-Marching in place Hip flx./ext./ abd./add.-Toe raises/heel raises -Sit to stand from pool |
| **Chu et al. (2004)** | 8 weeks | 24 (3/week) | 1 hour/ session | 26◦C –28°C | Supervised | -Land-based stretching- Light aerobic warm-up in the water: marching on the spot, single and double legged hopping holding onto the pool edge- Moderate to high aerobic activities: shallow water gait, running, side stepping- Light cool down: marching on the spot- Gentle stretching in water |
| **Noh et al. (2008)** | 8 weeks | 24 (3/week) | 60 minutes/ session | 34 °C | Supervised | Ai Chi and Halliwick methods |
| **Lee et al. (2010)** | 12 weeks | 36 (3/week) | 50 minutes/ session | 33◦C– 34 °C | Supervised | 10 types of task-oriented training |
| **Park and Roh (2011)** | 6 weeks | 36 (6/week) | 35 minutes/ session | 33◦C –35ºC | - | -Balance exercises-Joints ROM exercises-Strengthening exercises-Gait |
| **Jung et al. (2014)** | 12 weeks | 36 (3/week) | 40 minutes/ session | 33◦C –35°C | - | -Warm-up-Obstacle training-Cool-down |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Water-based Therapy*** | ***Length of intervention period*** | ***Number of sessions during period*** | ***Duration of sessions*** | ***Temperature of water*** | ***Supervised/ Unsupervised*** | ***Description of components of intervention eg. stretching, strengthening*** |
| **Park et al. (2016)** | 4 weeks | 12 (3/week) | 30 minutes/ session | 30 °C | Supervised | -Warm-up, cool-down techniques -Stretching-Trunk exercises |
| **Saharan et al., (2016)** | 8 weeks | 24 (3/week) | 50 minutes/ session | 33.3°C - 34.4 °C | Supervised | -Warm-up & Stretching-Strength-Balance Exercises-Pool floor gait-underwater treadmill gait -Breathing exercise |
| **Zhu et al. (2016)** | 4 weeks | 20 (5/week) | 45 minutes/ session | 34°C– 36 °C | Supervised | -Stretching of all joints -Strengthening exercise-Balance/coordination exercises -Aquatic treadmill exercises |
| **Chan et al., (2017)** | 6 weeks | 12 (2/week) | 60 minutes/ session | 34.5 °C | Supervised | -Balance exercises-Stretching exercises,-Strengthening -Endurance training |
| **Kum and Shin (2017)** | 6 weeks | 12 (2/week) | 40 minutes/ session | - | Supervised | -Balance-Gait training -Muscle strength -Proprioception |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Water-based Therapy*** | ***Length of intervention period*** | ***Number of sessions during period*** | ***Duration of sessions*** | ***Temperature of water*** | ***Supervised/ Unsupervised*** | ***Description of components of intervention eg. stretching, strengthening*** |
| **Park and Chung (2017)** | 6 weeks | 3 times/week | 30 minutes/ session | 28◦C- 30◦C | Supervised | -Underwater gait training involved wearing a 5% body weight sandbag on the affected side ankle use of a metronome |
| **Lee et al. (2018)** | 4 weeks | 20 (5/week) | 30 minutes/ session | 30°C–33°C | Supervised | -Warm-up-Motorized aquatic treadmill-Cool-down |
| **Park and Chung (2018)** | 4 weeks | 12 (3/week) | 40 minutes/ session | 30 ̊C - 32 ̊C | Supervised | -Gait training |
| **Kim and Chung (2019)** | 8 weeks | 24 (3/week) | 30 minutes/ session | 34°C | Supervised | -Underwater gait training |
| **Saleh et al. (2019)** | 6 weeks |  18 (3/week) | 45 minutes/ session | 33◦C –35◦C | Supervised | -Static and dynamic balance-Gait while holding item and by sideway/forward -Reaching forward-Balance board |

**Appendix 8: Comparison Details**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Land-based Therapy*** | ***Length of intervention period*** | ***Number of sessions during period*** | ***Duration of sessions*** | ***Supervised/ Unsupervised*** | ***Description of components of intervention eg. Stretching, strengthening*** |
|  **Douris et al. (2003)** | 6 weeks | 12 (2/week) | 20-30 minutes/ session | Supervised | * Gait forward Marching forward Sidestepping without crossing legs
* Tandem gait
* Marching in place Hip flx/ext/ abd/add
* Toe raises/heel raises
* Shallow knee bends Sit to stand from chair
 |
| **Chu et al. (2004)** | 8 weeks | 24 (3/week) | 1 hour/ session | Supervised | * Arm function program (focusing on paretic arm)
 |
| **Noh et al. (2008)** | 8 weeks |  24 (3/week) | 60 minutes/ session | Supervised | * Gym exercises
 |
| **Lee et al. (2010)** | 12 weeks | 36 (3/week) | 50 minutes/ session | Supervised | * 10 types of task-oriented training
 |
| **Park and Roh (2011)** | 6 weeks | 36 (6/week) | 35 minutes/ session | - | -Trunk stability strengthening-Gait-Pelvic tilts-Arm stretches- Balance training |
| **Jung et al. (2014)** | 12 weeks | 36 (3/week) | 40 minutes/ session | - | -Warm-up-Obstacle training-Cool-down |
| **Park et al. (2016)** | 4 weeks | 12 (3/week) | 30 minutes/ session | Supervised | -Warm-up & cool-down techniques for muscular relaxation and stretching. -Trunk exercises consisted of 6 subparts: bridge exercises, curl-ups with arms crossed, curl-ups with straight reaching, curl-ups with diagonal reaching, abdominal hollowing, and quadruped exercises |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Land-based Therapy*** | ***Length of intervention period*** | ***Number of sessions during period*** | ***Duration of sessions*** | ***Supervised/ Unsupervised*** | ***Description of components of intervention eg. Stretching, strengthening*** |
| **Saharan et al. (2016)** | 8 weeks | 24 (3/week) | 50 minutes/ session | Supervised | -Warm-up-Stretching-Strengthening-Balance exercises-Pool floor gait-Underwater treadmill gait -Breathing exercises |
| **Zhu et al. (2016)** | 4 weeks | 20 (5/week) | 45 minutes/ session | Supervised | -Strengthening exercises-Trunk mobility exercises-Treadmill training-Stretching of all joints |
| **Chan et al., (2017)** | 6 weeks | 12 (2/week) | 60 minutes/ session | Supervised | -Transfer training-Balance exercise program- Stretching exercises- Strengthening & endurance training- Gait and stairs training |
| **Kum and Shin (2017)** | 6 weeks | 12 (2/week) | 40 minutes/ session | Supervised | Balance , gait training Muscle strength proprioception, |
| **Park and Chung (2017)** | 6 weeks | 18 (3/week) | 30 minutes/ session | Supervised | -Over-ground gait training |
| **Lee et al. (2018)** | 4 weeks | 20 (5/week) | 30 minutes/ session | Supervised | -Postural control-Balance training-Gait training- ADL performance- Fine motor & sensory motor tasks for UL |
| **Park and Chung (2018)** | 4 weeks | 20 (5/week) | 45 minutes/ session | Supervised | -Conventional physical therapy |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Land-based Therapy*** | ***Length of intervention period*** | ***Number of sessions during period*** | ***Duration of sessions*** | ***Supervised/ Unsupervised*** | ***Description of components of intervention eg. Stretching, strengthening*** |
| **Kim and Chung (2019)** | 8 weeks | 24 (3/week) | 30 minutes/ session | Supervised | -Speed increase land gait training |
| **Saleh et al. (2019)** | 6 weeks | 18 (3/week) | 45 minutes/ session | Supervised | -Static and dynamic balance-Gait while holding item -Sideway/forward reaching-Balance board |

**Appendix 9: Outcome Measures**

|  |  |  |  |
| --- | --- | --- | --- |
| ***Study*** | ***Journal Info.*** | ***Gait Outcome Measure/s*** | ***Balance outcome measure/s*** |
|  **Douris et al., 2003** | 26: 3-6 | - | Berg Balance Scale (BBS) |
| **Chu et al., 2004** | 85(6): 870–874 | Speed: Self-selected gait speed (m/s) over 8-meter walkwayMuscle strength of paretic and non-paretic knee and hip joints (KinCom strength dynamometere) | Berg Balance Score (BBS) |
| **Noh et al., 2008** | 22 (10 -11): 966-76 | Modified Motor Assessment Scale | -Berg Balance Scale (BBS)-Mtd-Balance (mtd-Systems Inc., Neunburg v. Wald, Germany)) |
| **Lee et al., 2010** | 22(3): 331–336 | - | Good Balance System (GBS) |
| **Park and Roh, 2011** | 23(6): 905-908 | - | Good Balance System (GBS) |
| **Jung et al., 2014** | 26(3): 437–440 | - | Good Balance System (GBS) |
| **Park et al., 2016** | 28(6): 1904-1908 | Biodex Gait Trainer | - |
| **Saharan et al., 2016** | 8(8): 36341-36347 | Biodex Gait Trainer | Biodex Balance Equipment |
| **Zhu et al., 2016** | 30(6): 587-593 | -2-minute walk test | -Berg Balance Scale (BBS)-Functional Reach Test (FRT)-Timed Up and Go test (TUG) |
| **Chan et al., 2017** | 24(4): 228-235 | -2-minute walk test (2MWT) | -Berg Balance Score-Community Balance and Mobility Test (CBM)-Timed Up and Go Test (TUG) |
| **Kum and Shin, 2017** | 6(3): 120-126 | -Figure-of-Eight walk test- Functional gait assessment | - |

|  |  |  |  |
| --- | --- | --- | --- |
| ***Study*** | ***Journal Info.*** | ***Gait Outcome Measure/s*** | ***Balance outcome measure/s*** |
| **Park and Chung, 2017** | 29(2): 101-107 | **-**Medical Research Council (MRC) | -Berg Balance Scale (BBS)-Timed Up and Go Test (TUG) |
| **Lee et al., 2018** | 97(8): 533-540 | - | Berg Balance Scale (BBS) |
| **Park and Chung, 2018** | 30(2): 67-72 | -10 meter gait test (10MWT) | -Berg balance scale (BBS) -Timed Up and Go Test (TUG) |
| **Kim and Chung, 2019** | 31(4): 204-211 | -6-Minute Walk Test (6MWT) | Berg balance scale (BBS) |
| **Saleh et al., 2019** | 44(4): 485-492 | Biodex Gait System  | Biodex Balance System (BioBS) |

**Appendix 10: Studies that used BBS as an outcome measure for balance (pre-meta-analysis table)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author** | **Journal Info.** | **QA** | **Outcome Measure** | **Water-based Therapy Group Mean** | **Water-based Therapy Group Standard Deviation** | **Water-based Therapy Group (n)** | **Land-based Therapy Group Mean** | **Land-based Therapy Standard Deviation** | **Land-based Therapy Group (n)** |
| Chan | 24(4): 228-235 | 7/10 | Balance (BBS) | 46 | 6 | 13 | 43 | 12 | 12 |
| Chu | 85(6): 870–874 | 8/10 | Balance (BBS) | 52.0 | 3.3 | 7 | 52.2 | 3.6 | 5 |
| Douris | 26: 3-6 | 6/10 | Balance (BBS) | 52 | 3.0 | 6 | 50 | 2.0 | 5 |
| Kim | 31(4): 204-211 | 5/10 | Balance (BBS) | 52.70 | 2.16 | 10 | 48.22 | 3.03 | 9 |
| Lee | 97(8): 533-540 | 9/10 | Balance (BBS) | 50.11 | 13.81 | 19 | 42.64 | 7.56 | 18 |
| Noh | 22(10-11): 966-976 | 8/10 | Balance (BBS) | 50.9 | 2.8 | 13 | 44.5 | 6.7 | 12 |
| Park | 29(2): 101-107 | 7/10 | Balance (BBS) | 45.70 | 3.80 | 10 | 41.44 | 8.48 | 9 |
| Park | 30(2): 67-72 | 8/10 | Balance (BBS) | 49.33 | 1.73 | 9 | 49.25 | 1.75 | 8 |
| Zhu | 30(6): 587-593 | 9/10 | Balance (BBS) | 49.4 | 3.8 | 14 | 45.9 | 5.1 | 14 |

**BBS,** Berg Balance Score

**Appendix 11: Studies that used GBS or BioBS as an outcome measure for balance - Anteroposterior Sway Component (pre-meta-analysis table)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author** | **Journal Info.** | **QA** | **Outcome Measure** | **Water-based Therapy Group Mean** | **Water-based Therapy Group Standard Deviation** | **Water-based Therapy Group (n)** | **Land-based Therapy Group Mean** | **Land-based Therapy Standard Deviation** | **Land-based Therapy Group (n)** |
| Jung | 26(3): 437–440 | 6/10 | Balance (GBS) | SEC-APSV:12.6 mm/s | SEC-APSV:6.1 mm/s | 15 | SEC-APSV: 14.1 mm/s | SEC-APSV:4.0 mm/s | 15 |
| Lee | 22(3): 331–336 | 9/10 | Balance (GBS) | SEC-APSV:9.2 mm/s | SEC-APSV:3.3 mm/s | 17 | SEC-APSV:10.4 mm/s | SEC-APSV:4.0 mm/s | 17 |
| Park | 23(6): 905-908 | 6/10 | Balance (GBS) | SEC-APSV:11.4 mm/s | SEC-APSV:3.4 mm/s | 23 | SEC-APSV: 13.4 mm/s | SEC-APSV:3.8 mm/s | 23 |
| Saharan | 8(8): 36341-36347 | 7/10 | Balance (BioBS) | P1-API:1.6P2-API: 3.0Total Mean (API): 2.3 | P1-API: 0P2-API: 0Total SD (API): 0 | 2 | API: 1.6 | **0** | 1 |
| Saleh | 44(4): 485-492 | 7/10 | Balance (BioBS) | APSI: 1.22 | APSI: 0.14 | 25 | APSI:1.67 | APSI: 0.78 | 25 |

**GBS**, Good Balance System; **SEC-APSV**, Static Eyes Closed-Anteroposterior Sway Velocity; **BioBS**, Biodex Balance System; **P1-API**, Patient 1-Anteroposterior Index; **P2-API**, Patient 2-Anteroposterior Index; **API**, Anteroposterior Index; **APSI**, Anteroposterior Stability Index

**Appendix 12: Studies that used GBS or BioBS as an outcome measure for balance - Mediolateral Sway Component (pre-meta-analysis table)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author** | **Journal Info.** | **QA** | **Outcome Measure** | **Water-based Therapy Group Mean** | **Water-based Therapy Group Standard Deviation** | **Water-based Therapy Group (n)** | **Land-based Therapy Group Mean** | **Land-based Therapy Standard Deviation** | **Land-based Therapy Group (n)** |
| Jung | 26(3): 437–440 | 6/10 | Balance (GBS) | SEC-MLSV:7.1 mm/s | SEC-MLSV:6.1 mm/s | 15 | SEC-MLSV:8.0 mm/s | SEC-MLSV:4.0 mm/s | 15 |
| Lee | 22(3): 331–336 | 9/10 | Balance (GBS) | SEC-MLSV: 6.6 mm/s | SEC-MLSV: 2.8 mm/s | 17 | SEC-MLSV: 7.4 mm/s | SEC-MLSV: 2.3 mm/s | 17 |
| Park | 23(6): 905-908 | 6/10 | Balance (GBS) | SEC-MLSV: 8.6 mm/s | SEC-MLSV: 4.0 mm/s | 23 | SEC-MLSV: 11.5 mm/s | SEC-MLSV: 4.8 mm/s | 23 |
| Saharan | 8(8): 36341-36347 | 7/10 | Balance (BioBS) | P1-MLI: 1.6P2-MLI: 1.9Total Mean (MLI): 1.75 | P1-MLI: 0P2-MLI: 0Total SD (MLI): 0 | 2 | MLI: 1.6 | 0 | 1 |
| Saleh | 44(4): 485-492 | 7/10 | Balance (BioBS) | MLSI: 1.23 | MLSI: 0.38 | 25 | MLSI:1.84 | MLSI: 0.57 | 25 |

**GBS,** Good Balance System; **SEC-MLSV,** Static Eyes Closed-Mediolateral Sway Velocity; **BioBS**, Biodex Balance System; **P1-MLI**, Patient1-Mediolateral Index; **P2-MLI**, Patient2-Mediolateral Index; **MLI**, Mediolateral Index**; MLSI**, Mediolateral Stability Index

**Appendix 13: Studies that used different outcome measures to test the changes in gait – DISTANCE (m) (pre-meta-analysis table)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author** | **Journal Info.** | **QA** | **Outcome Measure** | **Water-based Therapy Group Mean** | **Water-based Therapy Group Standard Deviation** | **Water-based Therapy Group (n)** | **Land-based Therapy Group Mean** | **Land-based Therapy Standard Deviation** | **Land-based Therapy Group (n)** |
| Zhu | 30(6):5 87-593 | 9/10 | Gait (2MWT) | 63.3 m | 23.6 m | 14 | 42.8 m | 27.6 m | 14 |
| Chan | 24(4): 228-235 | 7/10 | Gait (2MWT) | 81 m | 40 m | 13 | 72 m | 54 m | 12 |
| Kim | 31(4): 204-211 | 5/10 | Gait (6MWT) | 233.08 m | 75.30 m | 10 | 203.99 m | 85.59 m | 9 |
| Kum | 6(3): 120-126 | 10/10 | Gait (F8WT) | 12.95 cm= 0.1295 m | 4.66 cm=0.0466 m | 13 | 16.23 cm= 0.1623 m | 8.82 cm= 0.0882 m | 15 |

**2MWT**, 2-minute walk test; **6MWT**, 6-Minutes Walking Test; **F8WT**, Figure-of-Eight Walk Test

**Appendix 14: Studies that used different outcome measures to test the changes in gait – TIME (s) (pre-meta-analysis table)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author** | **Journal Info.** | **QA** | **Outcome Measure** | **Water-based Therapy Group Mean** | **Water-based Therapy Group Standard Deviation** | **Water-based Therapy Group (n)** | **Land-based Therapy Group Mean** | **Land-based Therapy Standard Deviation** | **Land-based Therapy Group (n)** |
| Park | 29(2): 101-107 | 7/10 | Gait (MRC) | 18.30s | 0.82s | 10 | 17.11s | 0.78s | 9 |
| Park | 30(2): 67-72 | 8/10 | Gait (10MWT) | 17.44s | 7.10s | 9 | 18.75s | 11.83s | 8 |

**MRC**, Medical Research Council**; 10MWT**, 10 Meter Walk Test

**Appendix 15: Studies that used different outcome measures to test the changes in gait – SPEED (m/s) (pre-meta-analysis table)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author** | **Journal Info.** | **QA** | **Outcome Measure** | **Water-based Therapy Group Mean** | **Water-based Therapy Group Standard Deviation** | **Water-based Therapy Group (n)** | **Land-based Therapy Group Mean** | **Land-based Therapy Standard Deviation** | **Land-based Therapy Group (n)** |
| Saharan | 8(8): 36341-36347 | 7/10 | Gait (BioGT) | P1WS: 0.34 m/sP2WS: 0.14 m/s**Total mean: 0.24 m/s** | P1CV-A: 71%= 0.2414 m/sP2CV-A: 45%= 0.063 m/s**Total Mean of SD: 0.1522** | 2 | WS: 0.26 m/sec | CV-A: 65%= 0.169 m/s | 1 |
| Saleh | 44(4): 485-492 | 7/10 | Gait (BioGT) | WS: 64.87 cm/s= 0.6487 m/s | WS: 11.54 cm/s= 0.1154 m/s | 25 | WS: 54.94 cm/s= 0.5494 m/s | WS: 10.24 cm/s= 0.1024 m/s | 25 |
| Chu | 85(6): 870–874 | 8/10 | Gait (8m walkway) | SSGS: 1.18m/s | SSGS: 0.44m/s | 7 | SSGS: 1.04 m/s | SSGS: 0.40m/s | 5 |
| Park | 28(6): 1904-1908 | 7/10 | Gait (BioGT) | WS: 57.9= 0.579 m/s | WS: 7 cm/s=0.07 m/s | 13 | WS: 52.6 cm/s= 0.526 m/s | WS: 2.3 cm/s=0.023 m/s | 15 |

**BioGT**, Biodex Gait Trainer; **P1WS**, Patient 1 Walking Speed; **P2WS**, Patient 2 Walking Speed; **P1CV-A**, Patient 1 Coefficient of Variation-Affected; **P2CV-A**, Patient 2 Coefficient of Variation-Affected; **WS**, Walking Speed; **CV-A**, Coefficient of Variation-Affected; **SSGS**, Self-Selected Gait Speed

**Appendix 16: Studies excluded from meta-analysis (pre-meta-analysis table)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author** | **Journal Info.** | **QA** | **Outcome Measure** | **Water-based Therapy Group Mean** | **Water-based Therapy Group Standard Deviation** | **Water-based Therap-y Group (n)** | **Land-based Therapy Group Mean** | **Land-based Therapy Standard Deviation** | **Land-based Therapy Group (n)** |
| Park  | 23(5): 821-824 | 6/10 | Balance & Gait (POMA) | 23.95 | 4.31 | 22 | 21.09 | 4.70 | 22 |
| Park  | 26(6): 411- 417 | 8/10 | Balance (The Biorescue) | LOS: 152.06 cm2 | LOS: 7.17 cm2 | 15 | LOS: 146.87 cm2 | LOS: 5.61 cm2 | 15 |
| Park  | 24(11): 1087-1090 | 7/10 | Gait (SSS & DVC) | BWE-EF: 55.5 kgBWE-HF: 28.6 kgBWE-FF: 34.0 kgDVCHC-HJ: 22.6°DVCHC-KJ: 8.1°DVCHC-AJ: 3.6°DVCTF-HJ: 0.7°DVCTF-KJ: 33.6°DVCTF-AJ: 41.6° | BWE-EF: 11.2 kgBWE-HF: 10.7 kgBWE-FF: 9.6 kgDVCHC-HJ: 6.0°DVCHC-KJ: 4.0°DVCHC-AJ: 5.4°DVCTF-HJ: 12.3°DVCTF-KJ: 5.0°DVCTF-AJ: 5.1° | 10 | BWE-EF: 54.1 kgBWE-HF: 28.4 kgBWE-FF: 39.5 kgDVCHC-HJ: 19.2°DVCHC-KJ: 6.5°DVCHC-AJ: 4.7°DVCTF-HJ: -3.1°DVCTF-KJ: 30.1°DVCTF-AJ: 39.2° | BWE-EF: 12.6 kgBWE-HF: 13.1 kgBWE-FF: 18.8 kgDVCHC-HJ: 5.7°DVCHC-KJ: 3.6°DVCHC-AJ: 4.8°DVCTF-HJ: 13.8°DVCTF-KJ: 7.1°DVCTF-AJ: 10.2° | 10 |

**POMA**, Performance-Oriented Mobility Assessment; **MMAS**, Modified Motor Assessment Scale; **LOS**, Limited of Stability; **SSS**, SmartStep System; **DVC**, Digital Video Camera; **BWE-EF**, Body Weight Exerted-Entirefoot; **BWE-HF**, Body Weight Exerted-Hindfoot; **BWE-FF**, Body Weight Exerted-Forefoot; **DVCHC-HJ**, Digital Video Camera Heel Contact-Hip Joint; **DVCHC-KJ**; Digital Video Camera Heel Contact-Knee Joint; **DVCHC-AJ**, Digital Video Camera Heel Contact-Ankle Joint; **DVCTF-HJ**, Digital Video Camera Toe-off-Hip Joint; **DVCTF-KJ**, Digital Video Camera Toe-off-Knee Joint; **DVCTF-AJ**, Digital Video Camera Toe-off-Ankle Joint.