

EFFECTS OF COMBINED SKILLED AQUATIC AND LAND BASED THERAPY COMPARED TO LAND THERAPY ALONE ON BALANCE AND GAIT IN ADULTS AFTER A STROKE: A SYSTEMATIC REVIEW

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Overview

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Background¹

- Risk factors for stroke
 - Medical conditions including:
 - Hypertension
 - High cholesterol
 - High blood glucose/diabetes
 - Lifestyle behaviours:
 - Physical inactivity
 - Poor diet
 - Smoking
 - High alcohol consumption



Background

- Stroke is the second leading cause of death worldwide¹
- Leading cause of acquired disability in adults¹
- Affects 795,000 people per year in U.S.¹

- 65% of patients who have suffered a stroke experience loss of tactile sensation, the protection reaction, and proprioception, which is closely correlated with balance ability.²



Defined Inclusion Criteria

- **Skilled aquatic therapy**: skilled water therapy only performed by a licensed physical or occupational therapist
- **Land-based therapy**: traditional physical or occupational therapy performed by a license physical or occupational therapist
- **Adults**: aged 18 and older





Purpose

The purpose of this systematic review is to compare the effects of skilled aquatic therapy combined with land based therapy (AT/LBT) to land based therapy (LBT) on physical function in adults that have experienced a cerebrovascular accident (CVA).



Methods

Databases:

- MEDLINE/PubMed, CINAHL, ProQuest, Cochrane Library and hand-searching

Two reviewers independently assessed each article for methodological quality and came to a consensus using PEDro guidelines.



Search Terms

(“aquatic therapy” or “water therapy” or hydrotherapy or “water-based therapy” or “water exercise” or “aquatic exercise”) AND (“cerebrovascular accident” or CVA or stroke)



Search Limits

- Humans
- Peer reviewed articles
- English language
- Articles from 2011-2018

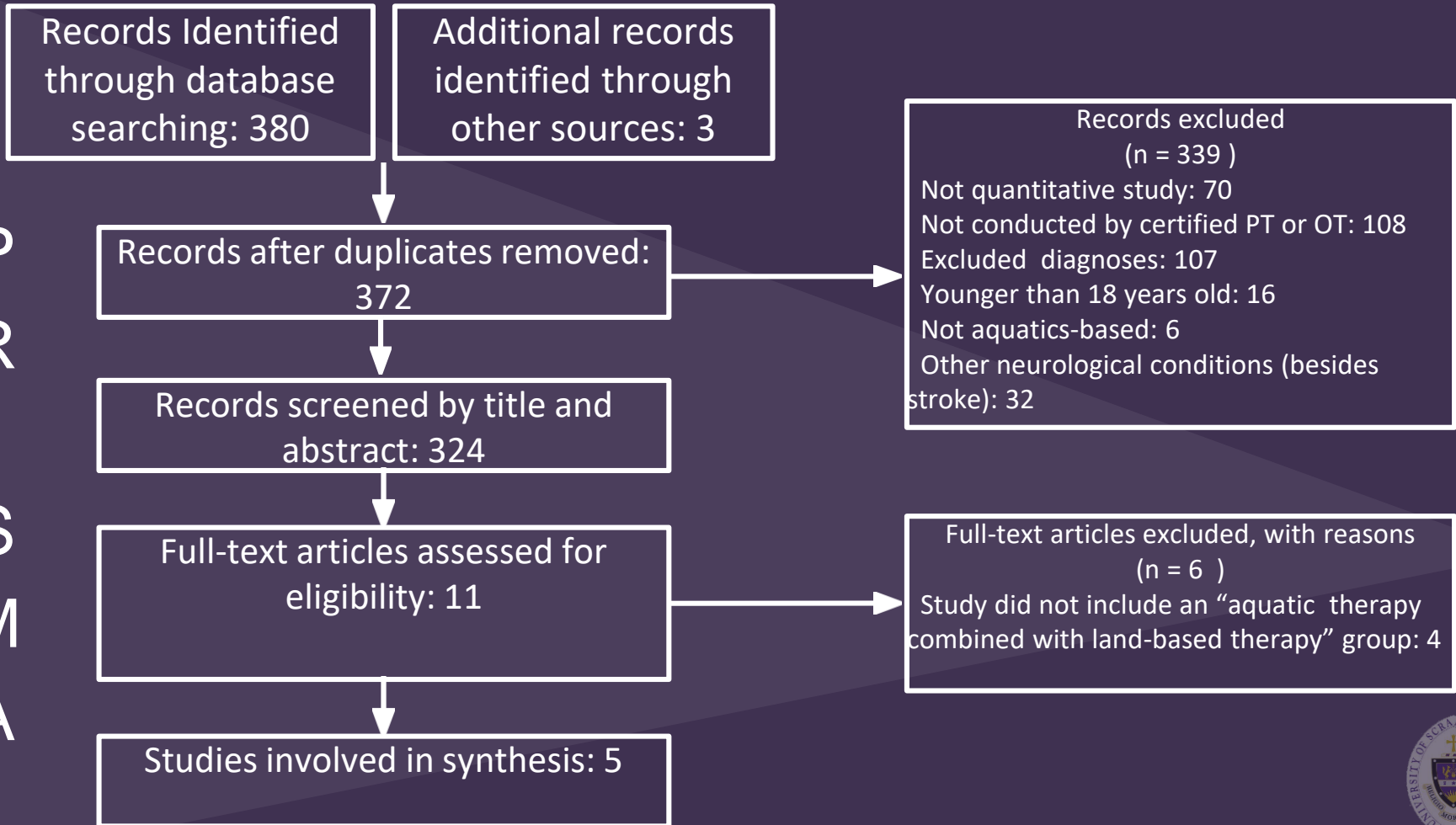


Selection Criteria

- Adults at least 18 years old
- Subjects must be s/p CVA
- Subjects have no other neurological conditions
- Therapy in studies provided by a “skilled” or licensed PT or OT



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PEDro Scores

Study	1	2	3	4	5	6	7	8	9	10	11	Total
Tripp et. al (2014)	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	7/10
Furnari et. al (2014)	Y	Y	N	Y	N	N	Y	N	Y	Y	Y	6/10
Matsumoto et. al (2016)	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y	7/10
Park et. al (2014)	Y	Y	N	Y	N	N	Y	Y	Y	Y	N	6/10
Han et. al (2013)	Y	N	N	Y	N	N	N	Y	Y	Y	N	4/10

Average Score: 6



Results

- A total of 372 articles were screened for eligibility
 - Five articles met selection criteria
- PEDro scores ranged from 4 to 7/10
 - Average score: 6
- Individual samples ranged from 20-120 participants
 - Total participants: 272
- AT/LBT interventions varied from 5-7x/week (30-45 min) for 2-12 weeks
- Primary outcomes:
 - Balance- BBS, FRT, postural sway
 - Gait- cadence, speed, 10MWT



Results- Gait Outcomes

- All studies with AT/LBT found greater improvements in outcome measures compared to the LBT groups
- Three of five articles focused on gait^{3,4,6}
 - All found significant improvements in outcome measures including cadence, speed, and 10MWT



Results-Balance Outcomes

- Three of five articles focused on balance^{2,5,6}
 - All found significant improvements with AT/LBT compared to LBT
 - Two articles utilized BBS, exceeding MDC values in AT/LBT and FRT scores exceeding MDC scores for AT/LBT^{6,2}.
- Outcome measures and protocols varied widely, but improvements were demonstrated in all studies.



Conclusions

- Moderate to strong evidence supports both short and long term therapy combining aquatic and land based interventions on improving balance and gait in adults following a CVA.
- Secondary outcomes showed improvements in subjects' quality of life and independence in regards to mobility after AT/LBT.



Clinical Relevance

- Clinicians should consider aquatic therapy with post-stroke patients to improve balance and gait.
- With clinically significant evidence of improved BBS and FRT scores, the likelihood of falls will be reduced in this specific population.



Clinical Relevance

- It is a safe intervention to improve aspects of mobility needed for community ambulation and activities.
- Evidence suggests AT/LBT, compared to LBT alone, better prepares patients with CVA for functional community participation and should be implemented into treatment.



Limitations of the Study

- Widely varied protocol (2-12 weeks with differing modes) and outcome measures used during assessments
- Acute vs. chronic populations complicate consistency of results
 - Inconsistencies in length of time since onset of CVA
- Conventional interventions were not clearly defined in several articles



Future Research

- Future RCTs should focus on aquatic therapy for a longer duration (6-12 weeks) with determination of the optimal mode and parameters for aquatic training, including frequency and duration in adults who have suffered a stroke.
- It would be beneficial for future studies to include a follow up assessment to examine long-term results.



Take Home Message

- Patients with deficits in gait or balance after a cerebrovascular accident can benefit from an aquatic therapy supplement to their conventional therapy. It can also improve patients quality of life and independence in regards to mobility.



References

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Thank you!

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Questions?

