



Aquatic Therapy for a Patient Post-Stroke: A Case Report

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ABSTRACT

According to the Centers for Disease Control and Prevention, stroke is the leading cause of long-term disability in the United States. The effects of stroke may consist of neurologic, musculoskeletal, and cognitive manifestations. Those who have had a stroke may present with barriers to conventional dry land therapy, preventing them from acquiring their full rehab potential. There is evidence that aquatic therapy may improve strength, balance, gait, range of motion, and psychological well-being; but there is little research on aquatic therapy for the stroke population specifically.

The purpose of this case report is to describe the evaluation, intervention, and outcome of a patient with a history of stroke who participated in an aquatic therapy program. The patient is an 84 year-old male with right hemiplegia, resulting in impaired gait, balance, and overall functional mobility. The aquatic therapy sessions were twice a week for eight weeks and included tone reduction, gait training, balance activities, and strengthening exercises. After eight weeks, the patient demonstrated improved strength, reduced muscle tone, and decreased risk of falls as evidenced by improved scores on the Berg Balance Scale and Timed Up and Go (TUG) Test. This case report suggests that aquatic therapy may be beneficial for patients with stroke who show minimal progress with land therapy or are unable to tolerate land activities

INTRODUCTION

Stroke affects approximately 795,000 Americans each year and costs over \$70 billion in related medical expenses and disability (American Stroke Association, 2012). The effects of stroke are devastating and consist of neurologic, musculoskeletal, and cognitive manifestations. A secondary impairment that is the most significant complication in this population is falls (Schmid & Rittman, 2009). Typical outpatient physical therapy for people post-stroke includes services to improve mobility, activities of daily living, and community reintegration (Duncan et al., 2005). Patients post-stroke may present with barriers to conventional dry land therapy, preventing them from acquiring their full rehab potential (Haring, 2002; Schmid & Rittman, 2007). The addition of an aquatic therapy program may be a solution to these barriers and allow for better functional outcomes.

Patient History & Examination

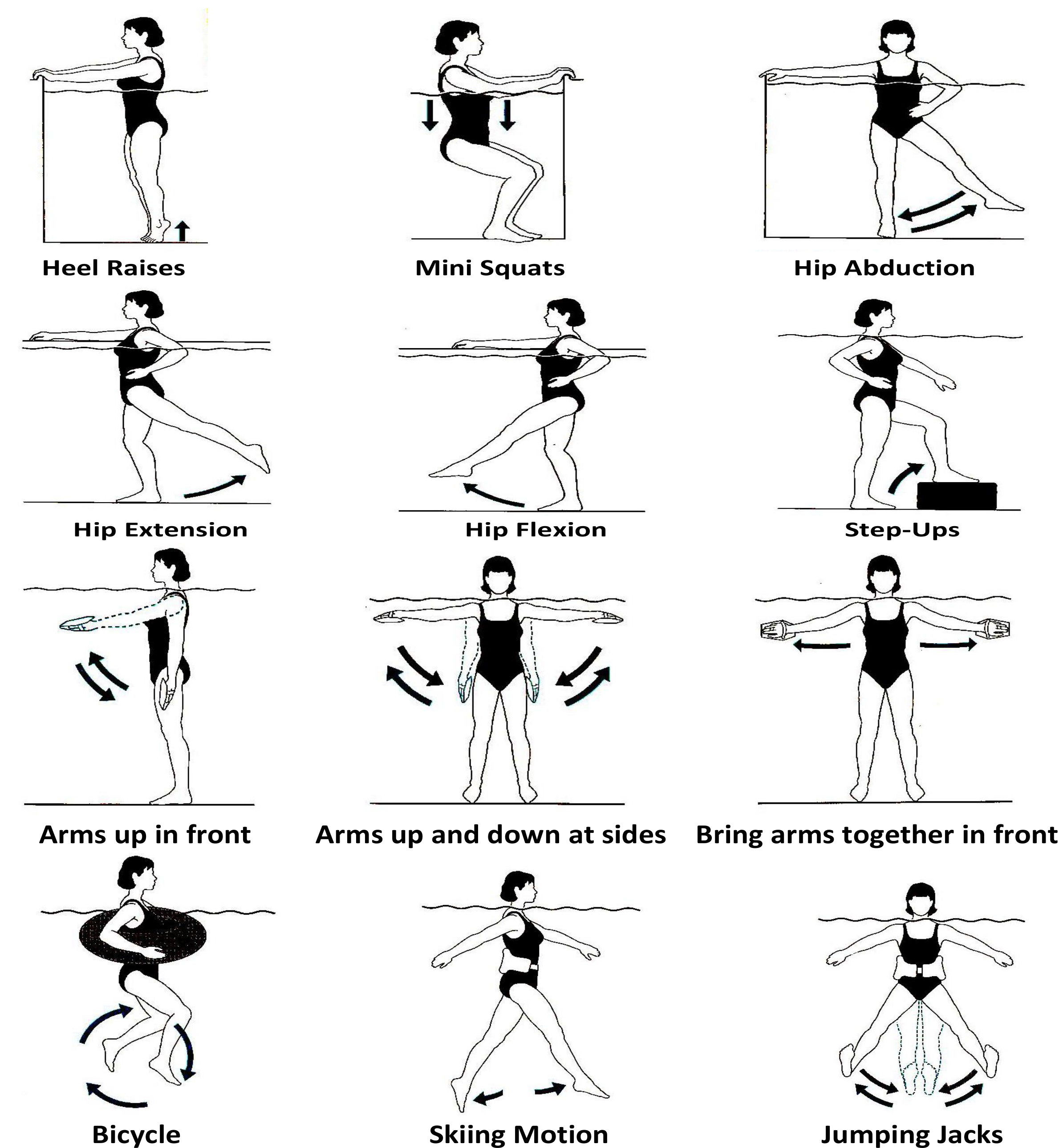
- Patient History
 - Demographics
 - 84 year-old Caucasian male
 - Medical Diagnosis
 - History of ischemic stroke affecting left middle cerebral artery (5 years ago), resulting in right hemiplegia
 - Broca's Aphasia
- Treatment Diagnosis
 - Impaired gait
 - Impaired balance
 - Decreased strength and range of motion
 - Hypertonicity
- Past Medical History
 - Hypertension, coronary artery disease, atrial fibrillation, Type II diabetes, sleep apnea, hernia repair, intrathecal Baclofen pump
- Current Level of Function
 - Requires assistance with bathing, grooming, dressing, cooking, and shopping
 - Uses wide base quad cane for household ambulation and wheelchair for community distances
- Examination: See "Outcomes" section for pre-treatment measurements

Intervention

The patient participated in 60-minute aquatic therapy sessions in a 93-degree pool twice a week for eight weeks. These sessions included interventions for tone reduction, gait, balance, and strengthening.

Intervention Summary

- 10-minute warm-up/gait training consisting of forward walking and side-stepping
- Hamstring and gastrocnemius stretches
- PNF D2 extension with rhythmic rotation to right upper extremity
- Lower extremity strengthening
- Paddle series
- Deep water exercises and lumbar traction
- Progression to Aquatic Maintenance Program



KEY REFERENCES

1. Duncan, P. W., Zorowitz, R., Bates, B., Choi, J. Y., Glasberg, J. J., Graham, G. D., Katz, R. C., Lamberty, K., & Reker, D. (2005). Management of adult stroke rehabilitation care: A clinical practice guideline. *Stroke*, 36, 100-143.
2. Haring, H. P. (2002). Cognitive impairment after stroke. *Current Opinion in Neurology*, 15, 79-84.
3. Schmid, A. A. & Rittman, M. (2007). Fear of falling: An emerging issue after stroke. *Stroke Rehabilitation*, 14, 46-55.
4. Schmid, A. A. & Rittman, M. (2009). Consequences of poststroke falls: Activity limitation, increased dependence, and the development of fear of falling. *American Journal of Occupational Therapy*, 63, 310-316.

Outcomes

Outcome measures were taken at the initial evaluation, after 30 days of treatment, and after 60 days of treatment. Comparisons of the pre-treatment and post-treatment measurements were made to determine if there were any changes.

Manual Muscle Test Grades Pre-Treatment

Upper Extremity	Left		Right		Lumbar Spine		
	Left	Right	Left	Right			
Shoulder Flexion	3+	2-	Hip Flexion	3	3	Forward Bend	4
Shoulder Abduction	3+	2-	Hip Abduction	3	2-	Extension	4
Elbow Flexion	4+	1	Hip Internal Rotation	3	2-	Sidebend Left	4
Elbow Extension	4+	1	Hip External Rotation	3	2-	Sidebend Right	3
Wrist Flexion	4+	0	Knee Extension	3+	1	Rotation Left	4
Wrist Extension	4+	0	Ankle Dorsiflexion	4	0	Rotation Right	4

Manual Muscle Test Grades Post-Treatment

Upper Extremity	Left		Right		Lumbar Spine		
	Left	Right	Left	Right			
Shoulder Flexion	3+	2+	Hip Flexion	3+	3	Forward Bend	4
Shoulder Abduction	3+	2+	Hip Abduction	3+	2	Extension	4
Elbow Flexion	4+	1	Hip Internal Rotation	3+	2-	Sidebend Left	4
Elbow Extension	4+	1	Hip External Rotation	3+	2-	Sidebend Right	3
Wrist Flexion	4+	0	Knee Extension	4-	2-	Rotation Left	4
Wrist Extension	4+	0	Ankle Dorsiflexion	4	0	Rotation Right	4

Pre-Treatment and Post-Treatment Comparison of Timed Up and Go (TUG), Berg Balance Scale (BBS), and Modified Ashworth Scale

	Pre-Treatment	Post-Treatment
TUG	44 seconds	36 seconds
BBS	19/56	25/56
Modified Ashworth Score	Upper Extremity: 3 Lower Extremity: 2	Upper Extremity: 2 Lower Extremity: 2

Discussion

The results of these outcome measures suggest that aquatic therapy may be beneficial for patients with a history of stroke. Although the patient continues to be a high fall risk, the patient made significant functional improvements that should not be overlooked. A randomized controlled trial needs to be conducted to determine if these results may be generalized. Aquatic therapy should be considered a viable option if the patient is unable to tolerate land activities or is not progressing on land.