Whalen Abstract

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Title: Comparing the effects of aquatic and land based exercise programs on balance in female collegiate athletes.

Background:
Balance is the ability to maintain a position within your base of support and react to a perturbing force.¹ This ability to maintain and react to forces is a key component in an athlete’s potential to perform sport specific skills.² Specifically in the female athletic population, balance has been proven to be a risk factor in injury.³,⁴ Dynamic postural control, the ability to maintain stability around a moving base of support, is required for sport specific drills, such as cutting and sudden stops.³ These activities cause the highest percentage of injuries within sports.⁵ Land based training has been proven to be essential in the athlete’s training program for neuromuscular improvement.⁶,⁷ It has also been hypothesized that aquatic exercise may be utilized in the athletic population based on the properties of buoyancy and viscosity, allowing for preferable rehabilitation conditions.⁶ However, research in the aquatic environment is lacking in the area of balance training in the athletic population. Therefore, we designed this study to determine the effects of an aquatic balance training program and create a positive impact on clinical decision making. This study will explore the efficacy of balance training programs for athletes performed in land and aquatic environments.

Methods:
A limited systematic review of the literature demonstrated a lack of current evidence to support balance training in the aquatic environment. More specifically, evidence to support aquatic balance training for female intercollegiate athletes is limited. In order to contribute to the evidence, this study compares land and aquatic based balance training programs. For the land based training program, exercises were developed based on those proven effective in high quality evidence.⁴,⁵,⁶,⁷,⁸ These land based exercises were modified for performance in the aquatic environment. Both training programs will be conducted on IC’s campus utilizing the OT/PT clinic and the A&E Center indoor pool. We will utilize the Health Related Quality of Life Questionnaire and Disablement of the Physically Active Scale to assess participant perception of balance on quality of life and activity levels to measure change. Balance will be assessed using the Star Excursion Balance Test and Neurocom’s Limits of Stability and Sensory Organization tests. Assessments and interventions will be supervised by two licensed physical therapists, Dr. McNamara and Dr. Plumeau, and carried out by six graduate student physical therapists. Participants will be healthy female athletes recruited from IC who have met the study inclusion criteria. The study will be conducted between December 2016 and June 2017.

Results:
The current evidence indicates that a majority of the research pertaining to aquatic interventions was performed in older populations, making conclusions for the female athlete difficult to draw.⁶,⁸,⁹,¹⁰ Further contributing to this difficulty, the majority of research regarding balance training
for female athletes was conducted on land. In this study, we anticipate improvements in balance in each environment demonstrating that either can be utilized effectively. However, based on the unloading properties of buoyancy, we hypothesize that the aquatic environment may be utilized to facilitate early balance training in the rehabilitation continuum for injured female athletes, thereby informing clinical decision making. Lastly, the study will lay the foundation for further research on the effects of aquatic balance training on injured female athletes.

**Conclusion:**
This study will compare an aquatic balance training program to a land program in female athletes. These results will guide the clinical decision making of athletic trainers, physical therapists, and other healthcare professionals rehabilitating female athletes. Specifically, the current standard of care for training balance in the injured female athlete is land based, which is often limited by the deleterious effects of impact and loading on the lower extremity. These effects are decreased by the unloading properties of the water. We hope that by proving the aquatic environment is an equal option to train balance, this training can be initiated earlier in the rehabilitation process due to the properties of the aquatic environment. With earlier initiation of activity and the resistive properties of water, athletes are provided with the opportunity to maintain conditioning throughout the rehabilitation process. We hypothesize that this will facilitate a more rapid and more successful return to sport.
Resources


