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Effects of a Four-Week Stand Up Paddleboard Program on Static Balance in College Students

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The Effects of a Four-Week Stand Up Paddleboarding Program on Balance

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Abstract

Stand Up Paddleboarding (SUP) is a relatively new water sport that requires balancing on a 8-14' board while paddling. SUP requires excellent balance to stay upright and in the proper paddling position. Previous research has suggested that SUP may enhance balance, but a training study has not yet been conducted. **Therefore, the purpose of this study was to examine the training effects of SUP on static and dynamic balance in college-age individuals**. Twenty-four college students had their balance assessed using a standard force plate system. There were three tests: a 30-second dominant leg stance with eyes open (FPEO), a 10-second dominant leg stance with eyes closed (FPEC), and a 30-second bilateral stance on a Bosu ball (FPBosu). Two groups of 12 were then gender- and height-matched. The experimental group met 3x/week for 4 weeks to paddleboard in the Dow Center pool. The training consisted of 15-20 minutes of different paddleboarding activities. The control group maintained their habitual activity. Both groups abstained from extraneous balance training. Our hypothesis was that the experimental group would improve in our balance measures as a result of the paddleboard training. Significant results would allow SUP to be recommended as an effective mode for improving balance in this population.

Background

- SUP is rapidly increasing in popularity all across the United States (Addison, 2013). A water sport, it that requires an 8-14' surfboard that is stood on by riders and propelled through the water with a long paddle.
- The bodies of water that are paddled on are rarely calm and glassy and the wind is seldom calm; therefore a great deal of balance is required to remain in an upright position on the board (Addison, 2013). In comparison to standing on a solid surface, stand up paddleboards are naturally unstable when placed in the water and loaded with the weight of a body. This instability is a result of the body's center of gravity being moved away from its vertical base of support (Jacobson, 1997).
- It is understood that increased balance may increase quality of life, enhance motor skills, and potentially increase athletic performance (Hrysomallis, 2011). Adopting an exercise activity that increases balance could be beneficial to any individual—whether a competitive athlete or a middle-aged individual trying to increase quality of life.
- The novel nature of SUP has resulted in a very limited amount of research on its effect on balance. However, the few previous studies that have been completed demonstrate that muscles used for stabilization of the trunk (i.e. abdominal, leg and back muscles) are all activated during SUP (Ruess, 2013). An additional study suggested that SUP training improved balance as measured by average mediolateral and anteroposterior movement of both feet after a one-time, 30-minute, self-paced paddleboard session (Ruess, 2013).

References:

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- Ruess C, Kristen K, Echelt M, Maly F, Litzenberger S, Sabo A. Stand up paddle surfing—an aerobic workout and balance training. Procedia Engr. 2013;(60):62-66.
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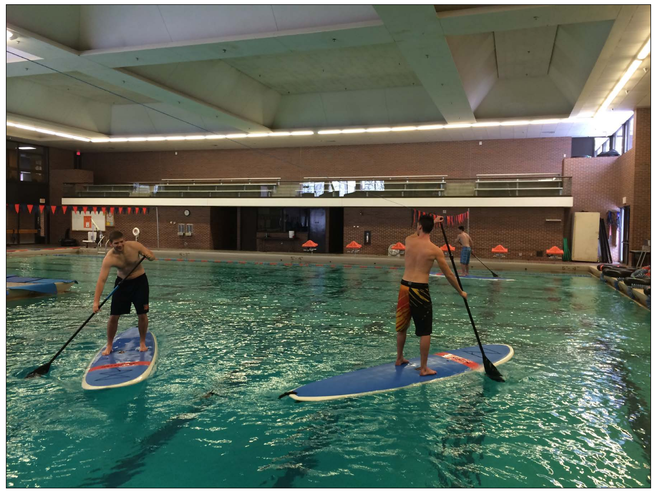


Figure (left). A typical training session in the Dow Center pool.

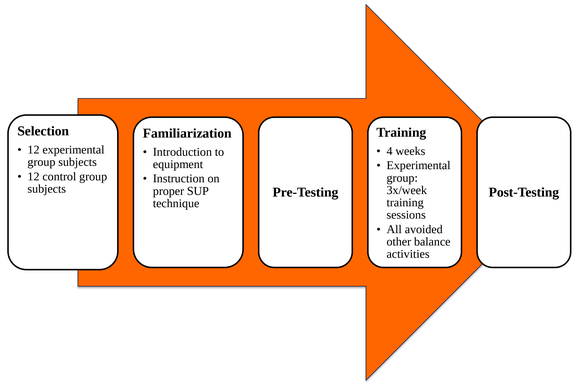
Methods

Participant Selection:

- 24 total subjects
  - 12-person experimental group
  - 12-person control group
- Convenience sample based on availability for designated training session schedule
- Groups were matched for gender and height

Testing Measures:

- Force Plate Eyes Open (FPEO)
  - 30 seconds. Unilateral (dominant leg). 45° hip flexion and 90° knee flexion in raised leg, hands on hips, and eyes closed. Static balance measure.
- Force Plate Eyes Closed (FPEC)
  - 10 seconds. Unilateral (dominant leg). 45° hip flexion and 90° knee flexion in raised leg, hands on hips, and eyes closed. Static balance measure.
- Force Plate Bosu (FPBosu)
  - 30 seconds. Bilateral. Participants stood on a Bosu ball with the convex side centered on the force plate. Hands on hips and eyes open. Dynamic balance measure.



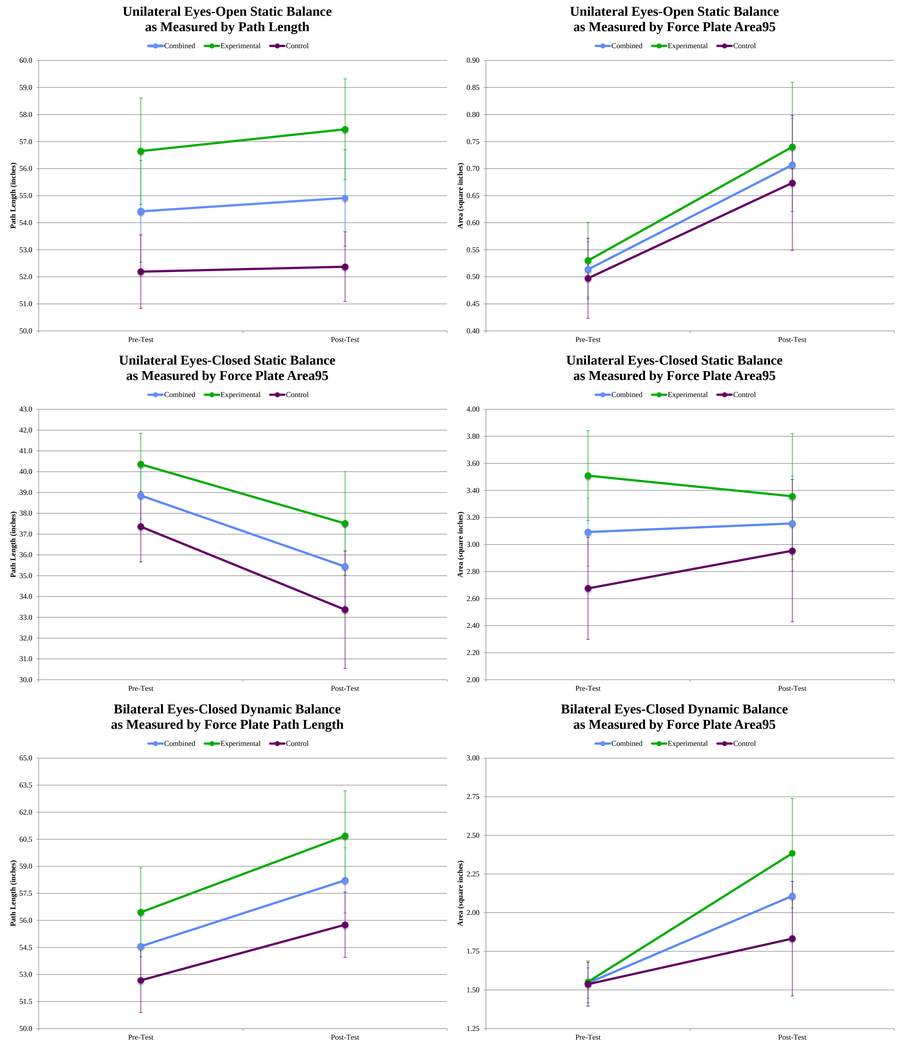
Conclusions

- The results suggest that SUP does not increase balance in college-age participants after four weeks of 3x/week training.
- Of the three balance tests administered (FPEO, FPEC, and FPBosu), there were no significant differences over time between the control and experimental groups, which is not what our hypothesis expected.
- FPEO Area95, FPBosu Area95, and FPBosu Path Length did differ significantly irrespective of group; however, the significance was in the opposite direction from what we expected. The participant's balance actually decreased between the pre-test and the post-test.
- The overall trends of the data lead us to suspect that there may have been error in our testing protocol.

Limitations

- The experimental training was performed in the Dow pool where the water conditions were nearly always the same, which was beneficial for the consistency of the study. However, the confined space and close proximity to the other participants may have inclined the participants to not challenge themselves as much for fear of falling onto the side of the pool or too close to another person in the pool.
- Using the pool also restricted the time that was available for the training to occur. This made it difficult to recruit participants and it made for a very strict training schedule that the participants could not make up if they missed. Being that there was a regimented schedule, selection of participants was limited to a smaller range.
- The "college lifestyle" of the participants—sleep-deprived, overworked, stressed out, and over-caffeinated—may have negatively affected the training and therefore the results of the study.
- It was the goal of the researchers to maintain consistency between the pre- and post-test, but due to scheduling conflicts with the building the pre- and post- test sequences were held in different rooms where the noise level was different. Also, there were other difficult factors to control in relation to the pre- and post- testing. For example, the positioning of the lifted leg in unilateral balance testing may have varied excessively, and the Bosu ball have have varied in its inflation pressure, both of which could have introduced significant error into our testing.

Results



	Time Effect	Group Effect	Intergroup Effect
FPEO Path Length	0.558	0.710	0.072
FPEO Area95	**0.000***	0.716	0.716
FPEC Path Length	0.095	0.767	0.167
FPEC Area95	0.884	0.621	0.179
FPBosu Path Length	**0.010***	0.659	0.209
FPBosu Area 95	**0.019***	0.237	0.384

Figures (above). Graphical and tabular representations of the data from the pre- and post-tests.