

A fundamental research of health promotion of low back pain using a sea water.

Sho Onodera (Kawasaki university of medical welfare)
Motohiko Miyachi (Kawasaki university of medical welfare)
Ken Miyakawa (Kawasaki university of medical welfare)

summary

Purpose: A swimming is easier in a sea water than normal water. A sea water has a high buoyancy. We have been studying the fundamental researches of aquatic exercises in a sea water regulating a specific gravity as good condition of physical activity. We investigated the passive drag of swimming in the swimming flume to be a new aquatic exercises of low back pain.

Methods: Seven males and six females were served as subjects (age: 23.8 ± 6.8 , height: $169.0\text{cm} \pm 8.9$, weight: $63.6\text{kg} \pm 10.0$; mean \pm SD). We used a swimming flume. Water and room temperature was 30°C . Buoyancy was regulated by Na_2SO_4 solution. Specific gravity of water was 0.99, 1.02, 1.03, 1.04. Passive drag was measured by strainage. Subjects gripped the handle connecting a end of steel line connected with strainage, and kept a prone position. Changes of position were recorded by high speed video camera by the side, and analyzed in fluorescent points stuck to acromion, greater trochanter, tibia, and lateral malleolus.

Results and Discussion: Figure shows changes of passive drag at flow velocity of 1.4m/s. The passive drag was significant decrease depending a increasing of specific gravity. This suggests the passive drag is decreased by the increase in buoyancy. However, these was no significant difference between 1.03 and 1.04. It suggests it does not decrease in passive drag depending a increasing of specific gravity bordering a critical point. Increasing a specific gravity of water, the position was changed to float a trunk, femur, and crus. At remarkable slow of floating in a normal water, position was changed in increase of a passive drag. However, in a Na_2SO_4 solution, a passive drag decreased at slow of floating. It suggests a water of high buoyancy, like a sea water, is good for aquatic exercises for preventing a low back pain. Furthermore, it is possible for body position to keep horizontally at slow of floating. We consider the aquatic exercises in a sea water is expected for remarkable effect as preventing a low back pain.