

4036009 SCEP/M : MAJOR : PHYSIOLOGY OF EXERCISE ;
M.Sc. (PHYSIOLOGY OF EXERCISE)

KEY WORDS : PHYSICAL ACTIVITY / NEURONAL ADAPTATION /
DEPRIVATION / BLIND / DEAF / EXERCISE

SUPALAK KHEMTHONG : PSYCHOMOTOR EFFECTS OF
EXERCISE IN BLIND, DEAF, AND NON-HANDICAPPED ADOLESCENTS.
THESIS ADVISORS : THYON CHENTANEZ, Ph.D., BOONSIRM WITHYA-
CHUMNARNKUL, M.D., Ph.D., YUPIN SANVARIDA, Ph.D., CHATTAYA
JITPRAPHAI, M.D. 152 P. ISBN 974 - 662 - 880 - 1

This research revealed some neuronal adaptations to long term physical activity in adolescents with visual or auditory deprivations and in non-handicapped adolescents. A groups of 72 male adolescents(aged between 15 to 18 years) with a randomized degree of congenital blindness and deafness was compared to 27 non-handicapped students. Each group was divided into athlete(-A) and non-athlete(-NA) subjects or into the high level of maximal oxygen consumption(H-) or low level of maximal oxygen consumption(L-) after 3-6 months of typical activity or after 4 months of mild intensity endurance training. Some psychophysiological tasks like non-verbal, verbal, and tactile memory tests were created and tested for reliability in 30 male normal extra-subjects before they were used in testing the above subjects. The physical fitness tests and several neurophysiological assessments, for instance visual, auditory, tactile, choice reaction times, were investigated and confirmed by statistical groupings of high and low maximum oxygen consumption. These results indicated that high physical fitness in male adolescents was effective in improving all reaction times of normal subjects whereas an optimal program promoted visual or auditory adaptation in the deaf or blind athletes respectively, but not in the temporary occlusions in normal athletes. Tactile processing was enhanced less than the visual system in the fit deaf while the enhancement of auditory adaptation in the fit blind was similar to that of the tactile system. Some compensations from the skilled movements in the exercised blind were the leg speed faster than the hand speed at the right side, whereas the exercised deaf had left hand strength greater than right hand strength. Moreover, all the exercise groups experienced similar improvement in the higher cognitive functions, though only the normal subjects improved in verbal counting. Blind responded in a shorter time in the verbal counting and memory times while deaf responded in a shorter time in the non-verbal memory time; consequently, both groups displayed high scores of tactile working memory. On the other hand, the non-exercised control groups had no significant improvement. Previous study suggests that adequate physical activity during early brain development could compensate for some sedentary handicapped life, especially the psychomotor performance which was associated with the physical fitness status and the physical conditioning exercise at the optimal intensity-frequency-duration-mode. Moreover, the other important factor was the opportunity for sensory-motor integration through home and school activities. The learning experiences of the intact vision or hearing subjects and the cognitive maturation before late adolescence will be enhanced by a suitable environment, and suitable amount of exercise.