SPIROMETRIC PARAMETERS AND PHYSICAL EFFICIENCY IN CHILDREN AND ADOLESCENTS WITH HEARING AND VISUAL IMPAIRMENT

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Children with hearing and visual loss suffer from sensory impairment that limits their engagement in physical activity. Lack of sensory input affects motor development and may cause decrease muscle strength and physical performance. A few reports have also demonstrated that the absence of verbal communication in infancy and early childhood can result in small changes in airway pressure which, in turn, decreases the function of the lungs.

Aim: The objective of the study was to investigate whether a sensory impairment has an effect on functional capabilities of the respiratory system and whether possible deviations from the reference ranges of selected parameters might indicate a decrease of physical efficiency.

Material and methods: Vital capacity (VC), forced vital capacity (FVC), forced expiratory volume in 1 second (FEV_1), peak expiratory flow (PEF), forced expiratory flow of 25-75% (FEF_{25-75}), and maximal voluntary volume (MVV) were measured in 86 deaf and 102 blind children and adolescents, and a matched group of hearing controls. All participated in a submaximal cycle ergometer exercise with continuous heart rate (HR) monitoring to calculate $VO_{2\ max}$ as a determinant of their physical efficiency. The dynamics of spirometric parameters were regularly monitored at yearly intervals from 2004 through 2006 and were compared with reference ranges and control group values.

Results: We found a significant influence of deafness on PEF ($P<0.01$), FEF_{25-75} ($P<0.05$), and MVV ($P<0.05$). As compared with the control subjects, the mean VC was significantly lower in blind adolescents ($P<0.05$).

Conclusions: Our results seem to suggest that both sensory defects during childhood and adolescence affect functional capabilities of the respiratory system. Additionally, the parameters of air flow through the airways during the maximal mid-expiratory flow were significantly decreased in deaf adolescents, which could be associated with the effect of specific pressure conditions on the respiratory muscles.