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At least eighty percent of brain grey matter is modifiable by physical activity: A review study

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Abstract

The human brain is plastic, i.e. it can show structural changes in response to the altered environment. Physical activity (PA) is a lifestyle factor which has significant associations with the structural and functional aspects of the human brain, as well as with the mind and body health. Many studies have reported regional/global brain volume increments due to exercising; however, a map which shows the overall extent of the influences of PAs on brain structure is not available. In this study, we collected all the reports on brain structural alterations in association with PA in healthy humans, and next, a brain map of the extent of these effects is provided. The results of this study showed that a large network of brain areas, equal to 82% of the total grey matter volume, were associated with PA. This finding has important implications in utilizing PA as a mediator factor for educational purposes in children, rehabilitation applications in patients, improving the cognitive abilities of the human brain such as in learning or memory, and preventing age-related brain deteriorations.

Keywords: Physical Activity; Brain Structure; Plasticity

2. Introduction

Physical activity (PA) has numerous beneficial effects on human body and mind, so much that it is often called the most efficient way to maintain health [1]. It lowers blood pressure [2], helps in weight loss [3], influences the physiological and psychological well-being [4], and improves cardiorespiratory fitness and muscular endurance