

Children of Extremely Preterm Birth: Not Too Late to Achieve Their Full Potential

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Description

Kei Tamai and his colleagues studied the physical fitness of non-disabled school-aged children born with extremely low birth weights ≤ 1000 g [1]. The subjects were 169 ELBW infants without cerebral palsy or intellectual disability. Physical fitness was assessed using the grip strength, sit-up repetitions, sit and reach, side steps, standing long jump, and softball throw tests. T-scores were calculated using national survey data. The T-scores (mean \pm SD) for the grip strength (43.7 ± 7.5), sit-up repetitions (44.2 ± 10.5), sit and reach (46.0 ± 9.7), side steps (40.9 ± 8.0), standing long jump (40.0 ± 9.8), softball throw tests (42.4 ± 8.1), and the overall T-score was 42.9 ± 5.5 . They concluded that, in non-disabled school-aged children born with extremely low birth weights, the physical fitness at approximately 8 years of age was significantly impaired compared to average Japanese children of the same age. Height, FVC, and Performance IQ independently predicted physical fitness, with height being the strongest predictor.

Skeletal muscle function partly correlates the physical fitness. Their finding may suggest that children reserve the potential of improving the grip strength, sit-up repetitions, sit and reach, side steps, standing long jump, and softball throw tests simply by training. Better self-esteem of children may further improve the motivation for training. Even the rehabilitation using neuromuscular electrical stimulation may be indicated to improve the skeletal muscle function [2]. Children born extremely preterm may not be too late to achieve their full potential. Let me review the relevant research on this subject.

Care of the baby of an extremely preterm birth is one of the most challenging aspects of perinatal medicine both for clinicians and families. Increasing survival and improving neurodevelopmental outcome are reported. The rate of survival without neurodevelopmental impairment increased between 2000 and 2011 in a large cohort of periviable infants [3]. Ishii et al. studied the database of Neonatal Research Network of Japan. The proportions of unimpaired or minimally impaired were 12.0% (22 w), 20.0% (23 w), 26.8% (24 w), and 33.1% (25 w) respectively [4].

The increased survival is associated with poor achievement of surviving children. Smith et al. reported reduced exercise capacity in children born very preterm [5]. The exercise capacity of the preterm group was approximately half that of the control group. They suggested the need of additional studies to evaluate the cause of this exercise limitation and whether it can be improved with a training program. Comparing with term-born control subjects, Rogers et al. have shown there were significant differences in motor performance in unimpaired ELBW survivors in late adolescence, reflected in aerobic capacity, strength, endurance, flexibility, and activity level [6]. They concluded that these differences in fitness and physical activity are related to the interaction of effects of premature birth on the motor system together with a more inactive lifestyle.

Gire et al. studied the quality of life of extremely preterm school-age children without major handicap [7]. Children reported the most significant QoL decline as (1) friends' relationships, (2) self-esteem and (3) leisure, while parents indicated (1) psychological well-being, (2) schoolwork and (3) vitality. Visser et al. studied the relationships of motor competence and psychosocial wellbeing in children aged 6-7 years [8]. They concluded that focusing on improving children's perceived object control and self-reported self-esteem may contribute to children's physical activity participation. Svedenkrans et al. conducted a population-based cohort study included 218,802 young men born in Sweden 1973-1983 [9]. They found that the physical fitness was associated with higher cognitive function at all gestational ages, also in young men born extremely preterm. Targeting early physical exercise may be a possible intervention to enhance cognitive performance and educational achievements in populations at risk, such as childhood and adult survivors of preterm birth.

From the standpoint of physical therapists, Svien et al. reported that the children born preterm did not demonstrate activity limitations or participation restrictions [10]. They suggested that physical therapists can advise parents of children born five to 10 weeks preterm that in all probability their school-age child will not be limited in sport team or physical activity involvement and can achieve expected levels of cardiovascular fitness. The subjects were not extreme preterm. Clemm et al. concluded

that exercise capacity was modestly reduced in adolescents born extremely preterm, but the values were considered normal in most participants [11]. Changes during puberty were similar to those observed for term controls, and the findings suggest similar trainability.

Summary

In non-disabled school-aged children born with extremely low birth weights, the physical fitness at approximately 8 years of age was significantly impaired compared to average children of the same age. Children born very preterm show reduced exercise capacity, and there were significant differences in motor performance in unimpaired ELBW survivors in late adolescence. There were significant differences reflected in aerobic capacity, strength, endurance, flexibility, and activity level.

The school-age child will not be limited in sport team or physical activity involvement and can achieve expected levels of cardiovascular fitness. Targeting early physical exercise may be a possible intervention to enhance cognitive performance and educational achievements in populations at risk, such as childhood and adult survivors of preterm birth. The findings suggest similar trainability with term born children. Children's perceived object control and self-esteem may contribute to children's physical activity participation. Children born extremely preterm could not be too late to achieve their full potential.

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