

## Effects of Hyperbaric Oxygen Therapy on Children with Spastic Diplegis Cerebral Palsy

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### Abstract

**Background:** Hyperbaric oxygen (HBO<sub>2</sub>), a treatment in which a patient breathes 100% oxygen at greater than atmospheric pressure (i.e. > 1 atmosphere absolute), is currently approved for 13 indications by the Undersea and Hyperbaric Medical Society (UHMS). To date, only anecdotal reports exist concerning the beneficial effects of HBO<sub>2</sub> therapy for individuals with cerebral palsy. The purpose of this pilot studay was to determine the effects of hyperbaric oxygen (HBO<sub>2</sub>) therapy for children with spastic diplegic cerebral palsy.

**Methods:** Twenty-five subjects (10 girls & 15 boys; mean age = 5.6 ± 1.6 years; range 3.1 – 8.2 years) with a functional diagnosis of spastic diplegia cerebral palsy participated in this study. In order to be considered for participation in the study, all subjects met the following inclusion criteria: 1) functional diagnosis of spastic diplegia; 2) age range: 3 – 8 years; 3) functional plateau in rehabilitation for the last 12 months; 4) ability to understand and respond to verbal instruction; 5) medical clearance for hyperbaric oxygen (HBO) therapy. Children were excluded from the study if any of the following criteria was present in their medical history; previous rhizotomy, recent thoracic surgery, seizures, cancer, chronic asthma, V-P shunts and previous HBO therapy. Subjects were evaluated pre and post HBO<sub>2</sub> therapy. Each evaluation consisted of the following: 1) video analysis; 2) Gross Motor Function Measure (GMFM); 3) Jebsen Test for hand function; 4) spasticity leel using the modified Ashworth Scale; and 5) parental questionnaire. The protocol for HBO<sub>2</sub> therapy was 95% oxygen at 1.75 atmospheres absolute (ATA) for 60 minutes. All subjects underwent 20 HBO<sub>2</sub> treatments. The schedule of treatments at McGill University was 1 treatment/day; 5 days/week for 4 weeks. The unit at McGill University is a monoplace hyperbaric chamber (Sigman Plus Monoplace Hyperbaric System, Perry Baromedical, Riviera Beach, FL) which pressurizes with 95% oxygen. Children were accompanied by a parent or guardian in the hyperbaric chamber for each treatment. The schedule of treatments at the Centre Hospitalier Regional de Rimouski is a multi-place (6 person) hyperbaric chamber that pressurizes with air and delivers oxygen to the patient via an oxygen treatment hood. The Wilcoxon matched pairs signed rank test for non-parametric measures was used to compare pre and post treatment data.

**Results:** Results showed improved gross motor function in 3 of the 5 items in the GMFM test, improved fine motor function in 3 of the 6 hand tests, reduced spasticity in 3 of 4 muscle groups when assessed by a physician specializing in CP, and improvements for 4 of 9 questions posed for parents. HBO therapy appears to be a promising treatment for children with CP.

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