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**Objective:** Children born preterm are at increased risk of deviation from the typical developmental trajectory. The probability of adverse developmental sequelae is increased in those with history of major perinatal complications. Retinopathy of prematurity (ROP) is a pathological disordered growth of retinal blood vessels occurring in very preterm neonates who require supplemental oxygen. ROP has been linked to intermittent hypoxemic events and blood gas derangements occurring in the Neonatal Intensive Care Unit (NICU), particularly in ventilated infants. Though presence and severity of ROP have been linked to neurodevelopmental impairment, little is known about the relationship between ROP severity and motor development in the preschool age. Because the same hypoxemic events and blood gas changes that lead to severe ROP may also lead to greater developmental deficits in motor control, we hypothesized that ROP severity will be inversely linked to the quality of motor functioning even in NICU graduates without neurological impairments.

**Participants and Methods:** We included 95 preterm (23.6 – 33.6 weeks gestation) preschoolers (49 females, 44 members of twin pairs or triplets). The participants' age ranged from 3.3 – 4.1 years (adjusted for prematurity). ROP screening was conducted during NICU stay and rated from immature retina (0) to grade 4. Motor abilities were assessed with the Peabody Developmental Motor Scales (PDMS-2). Cases with diagnosed perinatal brain pathology (moderate to severe) or cerebral palsy were excluded from analyses.

**Results:** We used linear mixed regression analyses with multiple gestation as a random factor. Severity of ROP was our predictor of interest, whereas socioeconomic status, sex, gestational age, and birth-weight SD served as covariates. Separate analyses were conducted using the PDMS-2 Total Motor, Fine Motor, and Gross Motor Quotients as dependent variables. ROP severity explained a unique portion of the

variance in the Total Motor Quotient ( $F[1, 89] = 5.59, p = .02$ ). Examination of the relationship between ROP severity and motor skill domains yielded a significant association for the Fine Motor Quotient ( $F[1, 89] = 6.19, p = .015$ ) and a trend for the Gross Motor Quotient ( $F[1, 89] = 3.64, p = .06$ ).

**Conclusions:** The results of this study reveal that increase in ROP severity is linked to poorer motor skills in preterm-born preschoolers without major disabilities or perinatal diagnosis of moderate to severe brain pathology. This association was evident for both fine and gross motor skills, though only the relationship between ROP severity and the former motor index reached conventional statistical significance. Importantly, ROP severity accounted for a unique portion of the variance in motor performance, over and above the variance explained by other perinatal risk factors. This result is consistent with previous research findings indicating that ROP is linked to the occurrence of multiple, subtle hypoxemic events and 'exposure' to blood gas derangements during NICU stay in very preterm neonates who require respiratory support.

**Categories:** Prenatal/Perinatal Factors/Prematurity

**Keyword 1:** motor function

**Keyword 2:** perinatal factors

**Keyword 3:** pediatric neuropsychology

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## 5 PediaTrac™: A Novel Measure for Screening Early Motor Development in Infants Born Preterm and Other At-Risk Populations

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USA. <sup>6</sup>Physical Medicine and Rehabilitation, University of Michigan, Ann Arbor, MI, USA

**Objective:** Infant motor development is a robust predictor of long-term developmental outcomes, especially in infants at high risk for neurodevelopmental impairments, such as those born preterm (PT, gestational age [GA] <37 weeks). Although direct assessments of motor development are available, they are infrequently applied by pediatricians in routine screening of the broader population of infants born preterm. Parent ratings, such as the Ages and Stages Questionnaire, 3rd Ed., can be used to screen for motor delays. However, this and other existing screening measures focus on whether children have reached milestones based on pre-established cutoffs, rather than on assessing development along a continuum of ability. The present study examined the validity of the Motor domain of the recently developed caregiver report screening tool, PediaTrac™, in distinguishing infants born PT from infants born full term (FT, GA ≥37 weeks) across the first 6 months of life. The reliability and factor structure of this motor scale were also evaluated.

**Participants and Methods:** PediaTrac™ is a web-based caregiver report assessing infant development across multiple domains, including motor functioning. This study reports on results from the PediaTrac™ Motor domain for the study sample of 571 caregiver-infant dyads (240 PT, 331 FT). Caregivers rated their infants on age-targeted motor skills during the newborn period (NB, defined as term equivalent for the PT group) and at 2-, 4-, and 6-months after the NB period. Item Response Theory (IRT) methods were applied to assess the reliability (i.e., information) of caregiver-reported motor skills at each age. Using the IRT item parameters of discrimination and difficulty, items were selected for inclusion and to estimate theta, an index of the latent trait, motor ability, for each infant. Analyses conducted at each age assessed the effects of group, sex, and group x sex on the motor trait. Scale reliabilities and factor structure were also examined.

**Results:** The PT group had significantly higher scores than the FT group on the motor trait at the NB period but significantly lower scores by 4 and 6 months, suggesting slower development of motor skills in the PT group. Means (SD) theta scores (similar to z scores) for the PT and FT groups, respectively, were .14 (.88) and -.05 (.91) for the NB period, -.01 (.90) and .01 (.91)

for 2 months, .20 (.90) and .36 (.88) for 4 months, and .46 (.78) and .66 (.89) for 6 months. Effects for sex and group x sex interactions were not significant. Reliabilities, estimated at a point close to mean theta, were .94, .93, .96, and .98 at the NB, 2-, 4-, and 6-month periods, respectively. Exploratory factor analyses revealed evidence for a single primary motor factor and multiple second-order factors at each age.

**Conclusions:** Findings provide strong support for applications of the caregiver reported PediaTrac™ motor scales in screening infants born PT and other at-risk populations for early delays or abnormalities in motor development. Advantages of this method include its ease of administration, sensitivity to developmental change, and promise in assessing subdomains of motor skill.

**Categories:** Prenatal/Perinatal Factors/Prematurity

**Keyword 1:** assessment

**Keyword 2:** child development disorders

**Keyword 3:** prematurity

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## 6 Preschool Motor Skills as Predictors of School Age Cognitive and Behavioral Outcomes in Children Born Very Preterm

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**Objective:** Motor weaknesses are frequently observed in very preterm children (VPT; gestational age [GA] < 30 weeks) prior to school entry and may serve as markers of risk for school-age cognitive and behavioral deficits. The aims of the present study were to: (1) determine if weaknesses in preschool motor skills in children born VPT and a full-term comparison group (FT; GA > 37 weeks) are associated with lower scores on tests of cognition and caregiver ratings of behavior in