

Incidence of Pre-Post Natal Birth and Developmental History Problems of Children with Sensory Processing Disorder and Those with Autism Spectrum Disorder

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Research Questions

- What if any types of pre-, peri- and post-natal and developmental factors are common in children with Sensory Processing Disorder (SPD) and in Autism Spectrum Disorder (ASD)?
- Are there significant differences between the SPD and ASD groups on any pre-, peri- and post-natal as well as developmental factors?
- What, if any comparisons may be made with available data on typical populations?

Participants

- Descriptive study involved a retrospective chart review completed on 1000 children with Sensory Processing Disorder (SPD) and 467 with Autism Spectrum Disorder (ASD) and SPD (referred to as ASD) at a large private practice specializing in assessment and treatment of sensory processing disorder.
- SPD Group, ages 3 to 17 years, 732 males and 268 females; ASD Group, 1 to 17 years, 385 males and 82 females.
- Two individuals (1 male and 1 female) were excluded from each group as not meeting inclusionary criteria

Procedure

- A confidential chart review of records of all current and discharged individuals who had received a sensory integration-based occupational or physical therapy assessment at the practice and who met the selection criteria were located through manual review of the records from 1997 to 2008.
- The Developmental Sensory History, a parent report questionnaire, developed by Occupational Therapy Associates –Watertown, P.C. (Koomar et al, 1996) was used to collect information on five areas: Pregnancy, Birth History, Childhood Illnesses and Injuries/ Early Childhood Issues and Developmental Milestones.
- The chart reviews and data entry were completed by research assistants and data analysis entered into SPSS version 15.0 (SPSS, 2006), was conducted by the third author, a statistician.

Results

Pre-Natal/ Pregnancy Factors

- Factors examined: *maternal stress, maternal illnesses, and maternal use of medications.*
- Results found that both children with SPD and ASD have a relatively high incidence of mothers with health related problems and/or high maternal stress, 45% in both groups, e.g. bleeding, eclampsia, toxemia, gestational diabetes, and death, divorce, moving to a new home, significant financial or job related problems. There were no significant differences between the two groups and no national comparison norms.

Birth/ Delivery-Related Factors

- Factors examined: *delivery complications, assisted delivery methods, gestational age and birth weight of the infant, and birth-related injuries/ illnesses.*
- SPD and ASD groups were significantly different on fetal distress which was significantly higher ($p=0.022$) in the SPD group at 4.4% compared to 1.9% in the ASD group.
- The incidence of assisted deliveries of any kind (C-section, induced labor, forceps and/or suction) was moderately high and significantly different between groups ($p = 0.011$) with 36% for the SPD group and 44% for the ASD , with forceps and suction being used more than in the normative studies and breech births occurring more than in normative populations and C-sections less frequently.
- In the area of gestational age and birth weight, there were no significant differences between the SPD and ASD groups on any items however, premature births were higher in ASD at 16% vs. 12% for SPD, which was equal to the national average. Higher birth weights were at an incidence of 15% for SPD, 18% for ASD, compared to 8% in national statistics.

Birth-Related Injuries and Illnesses

- Factors examined: *general birth injury, umbilical cord insult including cord wrap and cord prolapse, meconium present in amniotic fluid, jaundice (hyperbilirubinemia) at birth, and need for intensive care.*

- There were no significant differences between the SPD and ASD groups on any factors, but in comparison to national averages, incidence of umbilical cord insult at 5% for SPD and ASD in comparison to less than 1% in national averages, and jaundice was 3X higher for the SPD group and 4X higher for the ASD group than national averages at 26 and 20%, respectively, in comparison to 7% nationally.

Early Childhood Illnesses and Injuries

- Factors examined: *report of significant childhood illness, report of serious injuries, repeated ear infections, insertion of tubes in ears, presence of allergies, seizures, and asthma.*
- Significantly more children with SPD (32%) reported significant childhood illnesses compared to children with ASD (26%) at $p = .010$, while the incidence of ear infections was significantly higher for ASD at 68% vs. 61% for SPD, $p = .011$ as well as for allergies with 24% in SPD vs. 38% in ASD $p \leq .001$.

Infancy and Early Childhood Developmental Problems

- Factors examined: *reported sleeping problems, feeding problems, colic, child preferring certain positions, child dislike of lying on back, child dislike of lying on stomach, child dislike of bouncing, child not calmed by swings or cars, child nauseated by swings or cars, and child not experiencing Terrible Two's.*
- In general, both the SPD and ASD groups demonstrated moderately high incidences of these developmental problems with many factors over 20-30%. Incidence of sleep was significantly higher in the ASD group 44% compared to 32% $p \leq .001$, Feeding problems were present in 31% of the SPD group and 38% of the ASD group and colic occurred for 20% of the SPD and 24% of the ASD groups, although not significantly different.
- A high proportion were reported to not experience the “terrible twos”, 45% in SPD and 51% in ASD also a non-significant difference.

Early Childhood Developmental Milestones

- Factors examined: *not rolling over by 6 months, not walking by 18 months, not saying words by 12 months, not sitting alone by 10 months, not saying sentences by 24 months, not crawling by 12 months, having a brief crawling phase, having an absent crawling phase, and demonstrating hesitancy on stairs.*
- There was a significant difference between groups on hesitancy on stairs (SPD = 28%, ASD = 40%, $p \leq .001$), not sitting alone at 10 months (SPD = 2.9%, ASD = 6.5%, $p = .010$), and difficulties with language acquisition, no words by 12 months 33% for SPD and 55% for ASD. $p \leq .001$, and no sentences by 24 months at 21% for SPD and 56% for ASD, $p \leq .001$. Both groups reported similar high rates of brief or absent crawling phases, 37% in SPD and 43% in ASD.

Discussion

- Notably, no one problem was common to all children with SPD or ASD, as has been noted in earlier studies with both children with ASD and those with DCD (Cermak, et al., 2002; Mason-Brothers, et al, 1990). This finding likely points to the diverse nature of the possible etiologies of SPD and ASD, as well as the various subtypes within both diagnoses.
- There appears to be a pattern of risk factors, with children with SPD demonstrating, on average, seven problems across five or more domains while those with ASD had an average of eight problems across five or more domains.
- Overall, this study has shown that there are many similarities between children with SPD and ASD on a number of items, but there were also a number where there were statistically significant differences between the two groups which may eventually be helpful in differential diagnosis, reflecting potentially a greater degree of problems than a child with SPD.
- Currently, signs for pediatricians to watch for when monitoring a child for SPD or ASD would include maternal stress during pregnancy, jaundice, cord wrap or assisted delivery, high birth weight, ear infections, sleeping and eating difficulties, delayed motor milestones including delay in sitting, language delays, hesitancy on stairs and not experiencing the separation from parents and mastery associated with the “Terrible Twos”.

Study is submitted for publication to *Frontiers of Integrative Neuroscience*. Contact the third author, Alison Teasdale at research@thespiralfoundation.org for a copy of the power point and/or a list of references. For further information contact the first 2 authors at jkoomar@otawatertown.com or tmaybenson@otawatertown.com