


The Use of Pre and Postnatal Ultrasound for Early Detection of FASD in CIFASD

Tina Chambers
Ann Streissguth
Fred Bookstein
Andy Hull
Ken Jones



The Use of Ultrasound for Early Detection of FASD

Background: Prenatal Ultrasound

Matthews – South Africa (unpublished):

- n = 60 heavily exposed fetuses and controls
- Scanned with 2D ultrasound at intake, 22, 28, and 36 weeks gestation
- Measurements performed: BPD, OFD, AC, femur, humerus and foot length
- Subset of 20 subjects also had measurements of the frontal part of brain

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Background: Prenatal Ultrasound

Matthews – South Africa (unpublished):

➤ Results:

- No significant growth fall-off on any measure up to 28 weeks gestation
- However, 15% of exposed delivered preterm
- Measurement of bony orbits can be accomplished by ultrasound prior to the last month of pregnancy and within 1 mm reproducibility

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Background: Prenatal Ultrasound

Wass – Denver, CO (Am J OB/Gyn;185:737,2001):

- 29 heavily exposed women in a total sample of 155
 - Many recruited from treatment facilities so could have been mid to late pregnancy abstainers
- 2D ultrasound scans at six time points ranging from 12 to 42 weeks gestation
- Four brain measurements:
 - Transcerebellar diameter
 - Distance from the posterior margin of the thalamus to the inner calvarium
 - Frontal lobe measurement
 - Biparietal diameter

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Background: Prenatal Ultrasound

Wass – Denver, CO (Am J OB/Gyn;185:737-42, 2001):

➤ Results

- 23% of the heavily exposed fetuses fell below the 10th percentile for the frontal lobe measurement
- 4% of the fetuses in the control group fell below the 10th percentile on this measure
- Earlier ultrasound measurements appeared to be more sensitive to differences in size of the frontal lobe
- Dose response relationship between absolute ounces of alcohol consumed in first four weeks post conception and frontal lobe size

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Prenatal Ultrasound in CIFASD

	Matthews 60 exposed 4 scans	Wass 29 exposed 6 scans	Moscow 600 Exposed 3 scans	Ukraine 80 exposed 4 scans
BPD	Yes		Yes	Yes
OFD	Yes			Yes
AC	Yes		Yes	Yes
Femur, humerus, foot length	Yes		Yes	Yes
Orbital diameter	Yes			Yes
Frontal brain	Yes	Yes		Yes

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Prenatal Ultrasound in CIFASD

	Matthews	Wass	Moscow	Ukraine
EFW & CRL			Yes	Yes
Tibia length			Yes	Yes
Cord insertion			Yes	Yes
Placental position			Yes	Yes
Nuchal translucency & thickness			Yes	Yes
AFI			Yes	Yes

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Prenatal Ultrasound in CIFASD

	Matthews	Wass	Moscow	Ukraine
Heart and kidney			Yes	Yes
Bladder and stomach			Yes	Yes
Palate and lip			Yes	Yes
Spine			Yes	Yes
Hand and foot position			Yes	Yes
Fetal position			Yes	Yes

Postnatal Ultrasound for Early Detection of FASD

Conclusions: SEATTLE PILOT STUDY

- 1. The midline corpus callosum of the very young infant (birth through 3 months) can be imaged reliably via careful postprocessing of standard clinical ultrasound images by averaged unwarped imaging.
- 2. A substantial fraction of exposed infants show a potentially diagnostic anomaly of the splenium in these averaged unwarped images.
- 3. Quantification of these images seems straightforward using otherwise standard landmark and semilandmark methods, once the images themselves are reproduced.
- 4. The actual classification protocol finds an angular abnormality in 4 of the 7 infants exposed to high alcohol levels. The quantification then, may be a detection tool, not merely a group characterization.

Postnatal Ultrasound for Early Detection of FASD

Proposed New Site CIFASD in Vienna

- Seattle protocol already underway in Vienna with Dr. Horst Seidel, Dr. Arnold Pollak, Dr. Fred Bookstein funded by Austria. Screening all pregnant and delivering mother; expect 40 heavy alcohol exposed and 500 unexposed control babies will get neonatal ultrasound this year.
- All babies with abnormal cc findings according to the Bookstein protocol will receive a sedated MRI. Additionally, Dr. Seidel hopes the city of Vienna will fund postnatal ultrasounds on 1,000 babies of consecutively consenting mothers for a normative sample.
- 3. What can we do for them: conduct dysmorphology exams on the exposed infants with abnormal cc, train docs to do dysmorphology exams, and possibly collaborate on infant neurobehavioral follow-up

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Pre and Postnatal Ultrasound in CIFASD

	Seattle N = 50	Ukraine N = 150	Moscow N = 200
Exposed/Unexposed	Yes	Yes	Yes
Prenatal Scans/Expanded Scans		Yes	Yes
Postnatal Scans	Yes		
CIFASD Data Dictionary/db		Yes	Yes
Archived Images	Yes	Yes	Yes
CIFASD Physical Exams		Yes	Yes
Neurobehavioral Tests			Yes

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Pre and Postnatal Ultrasound in CIFASD

➤ Proposal:

- Formalize role and designate a “home” under the dysmorphology core for ultrasound measures in existing Consortium sites
- Standardize measures across sites and apply these standards to future sites involving ultrasound
- Expand the ultrasound component of existing sites to pursue promising signal from Seattle pilot