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As part of the national collaborative study in The Netherlands on very preterm and very low birthweight infant liveborn in 1983, we studied mortality and disabilities at 5 years of age in 292 infants with birthweight below 1000 grams. Mortality was 55.5%; in more than half of these cases, treatment was withheld or withdrawn. In 128 of 130 surviving children a detailed neurodevelopmental assessment was done during a home visit by 1 of 3 specially trained paediatricians. According to the WHO definitions¹ 38 children (29.7%) had a disability of which 16 (12.5%) had a minor handicap and 6 (4.7%) a major handicap. Although birthweight was clearly related to mortality, withdrawal of treatment was evenly distributed over all birthweight categories, and disabilities or handicaps showed no association with birthweight within this studygroup. We conclude that, given the permissive attitude on withholding or withdrawal of treatment in The Netherlands, tiny babies have a higher mortality risk, but in surviving children the disability and handicap percentages are similar to that in survivors of 1000-1500 g (disabilities 28.2%, handicaps 14.3%).

¹ WHO (1980) International Classification of Impairments, Disabilities and Handicaps.

42 NEUROLOGICAL DEVELOPMENT AT AGE 7-10: SIGNIFICANCE OF CHRONOLOGICAL AGE, HANDEDNESS, SEX, PREMATURITY AND CEREBRAL PALSY

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Development of repetitive, alternating and sequential movements was studied longitudinally in 276 term and preterm children. Speed, quality of motor performance and amount and type of associated movements were recorded for 11 motor tasks (methods according to Denckla DMCN 15, 1973; Wolff DMCN 25, 1983). Results were as follows: 1) Age-related improvement of timed performances and of quality of performance and decrease of associated movements; 2) Superior performance of the dominant extremity in 9 of 11 tasks, exceptions being alternating heel-toe tapping and sequential finger-thumb opposition; 3) Left handers tended to perform less well than right handers in the preterm group only; 4) Girls outperformed boys on speed, quality and amount of associated movements; 5) Performances of neurologically unimpaired preterm children were comparable to those of term children (age corrected for prematurity); 6) Impact of cerebral palsy decreased with maturation of motor functions.

43 MRI IN HEMIPLEGIC CEREBRAL PALSY: CORRELATION WITH THE SEVERITY OF MOTOR AND DEVELOPMENTAL ABNORMALITY
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1989 - 1990 MRI was performed in 24 infants with newly diagnosed hemiplegic cerebral palsy (obvious postnatal causes excluded) using a 2.35 T MR system. There were 17 boys and 7 girls, 18 patients were born at term, 6 preterm. The hemisyndrome was right sided in 16, left sided in 8 children. Development was assessed with Griffith or Snijders-Omen test. MRI findings were: normal (n=4, 17%), unilateral lesions (n=13, 54%) ranging in size from small (single or multiple) cysts to almost hemihydranencephaly, and bilateral lesions (n=7, 29%) of various size and location. All lesions (except two) were found in the territory supplied by the middle cerebral artery or in watershed areas. In general it was not possible from MRI findings or clinical data to date the lesions more precisely to the pre- or perinatal period. We found no consistent correlation between the topography or size of the MRI lesions and the severity of the hemiplegia and/or the degree of mental development.

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INTRAUTERINE GROWTH RETARDED (IUGR) CHILDREN: FOLLOW-UP AT ONE YEAR.

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In a prospective multicenter study para 1 and 2 women were followed closely from 17 weeks gestation to identify risk factors for and consequences of IUGR. This report describes the impact of IUGR on postnatal growth and development with special reference to mothers who repeatedly give birth to small for gestational age (SGA) babies (repeaters). 190 SGA infants (birth weight <10th percentile) were examined at birth and at 13 months of age and compared with a control group of 414. 79 of the SGA infants were born by repeaters. At 13 months of age growth and psychomotor development (Bayleys scale) were evaluated. At follow-up, the SGA children were still significantly (p < 0.001) shorter (75.4 cm vs. 77.3 cm), lighter (9.6 kg vs. 10.4 kg) and had a smaller head circumference (46.7 vs. 47.5) than the controls. The mental developmental index (MDI) was also significantly lower (MDI=111.3 vs 115.1, p=0.001) while the psychomotor index (PDI) did not differ (PDI: 106.1 vs 106.5). Within the group of SGA infants the MDI did not differ between repeaters and non-repeaters (MDI=112.4 vs.110.8). The results confirm that IUGR has a negative effect on postnatal growth and development. SGA infants of repeaters do not as a group have a better outcome at one year of age when compared to those of non-repeaters.

45 IMPROVING OUTCOME OF INFANTS WITH BIRTHWEIGHT <1000 g. A POPULATION BASED ANALYSIS OF 12 YEARS PERIOD.

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During 1978-89 about 16 000 infants were born yearly in the catchment area of the NICU at the Children's Hospital, University of Helsinki. The number of all extremely low birthweight infants (ELBWI, bw <1000 g) varied between 44 and 80/year. The number of ELBWI admitted to the NICU increased from less than 20 to about 40/year. The mortality rate remained relatively stable at about 40% and thus the number of survivors increased from 8 to 25/year. Especially the number of survivors below 800g and below 27 gestational weeks increased. Despite of this increasing proportion the rate of intraventricular hemorrhage is decreasing (from 50% to 15%).

The proportion of children with normal neurodevelopment during the second year of life increased from 40-70% during the early 5 years to 63-84% during the last 3 years. The proportion of children with major disability decreased from 28% to 8%. Poor neurological outcome was associated with sepsis in the NICU, early year of birth, IVH, poor socio-economic status and low birthweight. The early neurological status correlated well with the outcome at 4 years of age.

The improved techniques in neonatal care have increased the probability of survival in ELBWI without increasing the number of disabled children among them.

46 BRAIN DEVELOPMENT IN PRETERM INFANTS studied by MRI, MRS, APiB, Dubowitz scale and BAEP

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We designed a longitudinal study to investigate brain maturation in preterm infants, using the Assessment of Preterm Infant's Behavior (APiB), MRI (GW:M), MRS (NAA/Cho), Dubowitz scale (D) for neurologic assessment and brainstem auditory evoked potentials (BAEP:V). Age-dependent maturational changes are presented in the first six patients, studied at a mean gestational age (GA) of 32.7±1.4 weeks and again at due date (mean GA:40.1±1.3w).

| | MR/D/BAEP | | | | | |
|-------|-----------|---------|-------|---------|----------|-----------------|
| | GA(1) | GA(2) | p | GA(1) | GA(2) | p |
| AUTON | 7.6±0.6 | 4.9±1.1 | <0.01 | GW(1-4) | 1.6±0.4 | 3.0±0.5 <0.0001 |
| MOTOR | 7.6±0.6 | 4.9±1.3 | <0.01 | M(1-4) | 1.1±0.4 | 3.1±0.4 <0.0001 |
| REGUL | 7.0±0.8 | 4.8±1.2 | <0.05 | NAA/Cho | 0.5±0.4 | 0.9±0.9 <0.01 |
| EXFAC | 7.8±0.8 | 4.9±1.8 | <0.05 | D(0-51) | 18.8±4.4 | 31.1±6.3 <0.01 |
| | | | | V(ms) | 7.3±0.4 | 6.7±0.3 <0.05 |

Conclusion: First results indicate, that grey-white matter differentiation and myelination in MRI clearly discriminates maturational stages in brain development followed by MRS, behavioral studies assessed in autonomic-, motoric organization, self-regulation and examiner facilitation, neurologic assessment and BAEP.