

# The Very Low Birthweight Infant

A Challenge to Neonatology and Obstetrics

Symposium Zürich 1989

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56 Figures. 119 Tables

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Georg Thieme Verlag Stuttgart · New York 1990

## **Active obstetrical management in severe intrauterine growth retardation and the influence on long-term prognosis - results of two follow-up studies 1970-1982**

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Peri- and postnatal data of children with severe intrauterine growth retardation (birthweight  $\leq 3$ . percentile according to Hohenauer) born between 1970 - 1975 (n = 145) and 1976 - 1985 (n = 118) are presented. Due to the earlier prenatal diagnosis of IUGR in the latter period the incidence of premature delivery (gestational age  $\leq 37$  weeks) rose from 15% (1970 - 1975) to 34% (1976 - 1985). The incidence of Cesarean sections increased from 32% to 75% in the preterm delivered group.

Follow-up studies were carried out in 59 children born between 1970 - 1975 (age: 6.2 - 12.1 years) and 35 children born between 1976 - 1982 (age: 1.1 - 8.0 years). Neurologic sequelae mostly of a mild degree were seen in 32% (1970 - 1975) and 26% (1976 - 1982). EEG investigations demonstrated unspecific abnormalities of a mild to moderate degree in 36% and 35%, respectively. Psychologic testing showed abnormalities in 38% of the older age group (1970 - 1975) using the Göttinger Formreproduktionstest and in 21% of the younger age group (1976 - 1982) where the Denver Developmental Screening Test was performed. There were no differences between follow-up results of premature and full-term children with severe IUGR. Due to the advances in neonatal intensive care treatment of very low birthweight babies during the last five years we expect a further improvement of the long-term prognosis of these high risk babies.

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## Developmental outcome at age 2 of preterm infants less than 1,250 g at birth

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In this study a cohort of prematurely born infants with a birthweight of less than 1,250 g are being followed from birth to schoolage. In this report data on developmental outcome at the age of two years are presented.

### Subjects

Between January 1983 and December 1985, 127 infants with a birthweight < 1,250 g were born at the Frauenklinik Zurich. 70 or 55% of these children survived the neonatal period. 67 (96%) of the surviving children were followed-up at 2 years of age. Medical characteristics at birth are presented in Table 1. Their mean gestational age was 29.6 weeks, ranging from 25 to 35 weeks, their mean birthweight was 1,056 g, ranging from 780 to 1,250 g. 68% of the infants had a birthweight appropriate for their gestational age, 32% were below the 10th percentile of the Swiss intrauterine growth standards (1). 97 healthy term children of the Zurich Generation Study served as a control group.

Table 1: Medical characteristics at birth (n = 67)

	Mean	Range	%
Gestational age (weeks)	29.4	25.7 - 35.2	
Birthweight (g)	1,056	780 - 1,250	
Appropriate for gestational age (AGA)			68
Small for date (SFD)			32

### Methods

The children were tested at a mean age of 27.3 months (22 to 39 months). The age of testing was corrected for prematurity.

Mental development was assessed by the Bayley scale (2). A standardized neurological examination was carried out (a modified version of Prechtl et al. (3)) and 10 anthropometric measurements were taken.

The results on growth and mental development of the study group are expressed as standard deviations from the mean values of the control group. Significant statistical differences between the two groups were calculated by means of the Wilcoxon test.

### Results

With respect to weight, length and head circumference significantly lower values were noted in the preterm than the term children (Table 2). Their mean weight was 0.83 standard deviations (SD) below the mean weight of the control group (Figure 1). The corresponding value of their length was -0.47 SD and of their head circumference -0.61 SD. These differences were highly significant. Head configuration was also significantly different, the biparietal diameter being smaller and the fronto-occipital diameter being larger in the preterm than in the term group.

Table 2: Weight, length and head growth at age 2

	Standard deviation score	P
Weight	- 0.83	< 0.001
Length	- 0.47	< 0.01
Head circumference	- 0.61	< 0.001
Biparietal diameter	- 0.98	< 0.001
Fronto-occipital diameter	+ 0.36	< 0.05

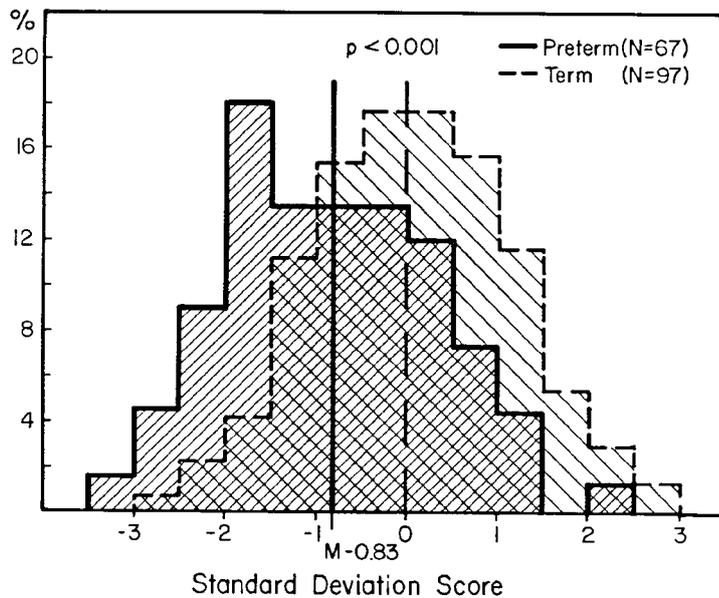


Figure 1: Weight distribution (presented as standard deviation scores) in preterm and term children at age 2

With respect to mental development the preterm children performed at a significantly lower level than the term children. Their mean mental score was 1.1 SD below the mean of the control group (Figure 2). 16% of the preterm, but only 3% of the term children achieved mental scores more than 2 standard deviations below the mean of the control group. 59% of the children were judged as neurologically normal. 33% of the children were diagnosed as having spastic cerebral palsy, 23% of mild, 5% of moderate and another 5% of severe degree, 8% of the children were ataxic-hypotonic.

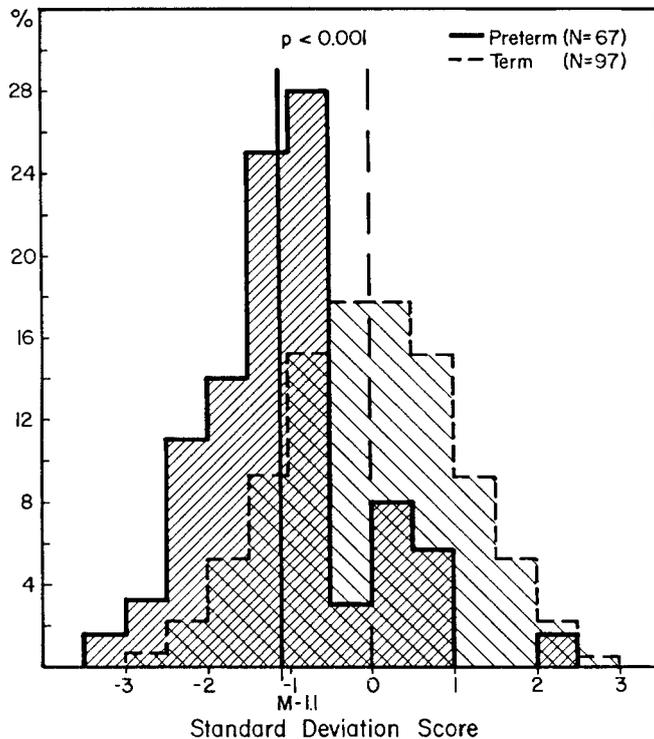


Figure 2: Mental development (presented as standard deviation scores of Bayley Mental Scales) in preterm and term children at age 2

### Conclusion

At 2 years of age 67 preterm infants weighing < 1,250 g at birth differed significantly from a healthy term group with respect to growth, mental and neurological development.

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This work was supported by the Swiss National Science Foundation (3.824-0.87) and La Fondation Suisse pour l'Encouragement de la Recherche Scientifique sur l'Arriération Mentale.

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## 14-year-outcome of 12 children with a birthweight < 1,000 g

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In the years 1971 - 1973, 32 newborns with a birthweight of < 1,000 g were admitted to the neonatal intensive care unit of the Children's University Hospital of Basle. The survival rate was 41% (13 children). One survivor was lost to the follow-up due to emigration. The other 12 children were examined again at the age of 14.

### Neonatal data

Figure 1 shows the neonatal data of the 4 boys and the 8 girls. The lowest birthweight was 750 g (two girls). The children are listed in order of the severity of their neonatal illness and by their sex. Five babies had an idiopathic respiratory distress syndrome (IRDS) of at least second degree. Four of them were intubated immediately in the delivery room, one later because of an apnoea and a pH of 6.91, other causes of intubation were a Mikity-Wilson-Syndrome and apnoeas respectively. It should be noted that all babies were vaginally delivered. Two unrelated twins were small for gestational age.

### Methods

The examination at the age of 14 included a somatic investigation (i.e. height, weight, blood-pressure, visus, etc.), the Kiphard test for motor performance, the Raven-Intelligence test, a psychological test (Hamburger Neurotizismus- und Extraversionskala), a language test and a questionnaire for the parents and the child.

226 randomly chosen children from Basle who were investigated at the same age and with the same methods served as a control group. Percentiles of height and weight as well as intelligence and motor skill quotients were calculated from the results of this control group.

### Results

*Somatic status (Table 1):* At the age of 14, eight children had a height below the 10th percentile. About the same result can be seen regarding the weight, whereas the body-mass index was not different from the control group. The sexual development was also within the normal range. Significantly higher systolic and diastolic blood pressure were found. No correlation between increased blood pressure and any events in the neonatal period could be found, especially not with the use of umbilical catheters. Those children with both, arterial and venous umbilical catheters had the lowest blood pressure at age 14. Three children are wearing glasses, visual testing was normal in all children. No child has a retrolental fibroplasia. None of the 12 children has a hearing disorder. General health had been the same as in the control children.