In fetuses with gross brain malformations such as anencephaly, severely distorted movements have been found. Not only is the quality of movements abnormal but also their temporal sequence. Frequently, the different movement patterns are no longer distinguishable but merge in a "motor cacaphony" (3). In growth retarded fetuses the quality of movement patterns is changed although they are still recognizable as such. They become monotonous and lack the normal subtle fluctuations in speed, force and amplitude. Similar to the case in neurologically abnormal preterm infants (4), abnormal fetal movements can be reliably recognized by independent observers (5). Changes in the quantity of fetal movements is a less sensitive indicator as this only decreases markedly in very serious conditions, i.e. terminal states. The ultrasound observation of fetal movements is a promising approach to the neurological assessment of fetuses exposed to a compromising condition.

1. Vries JIP de, Visser GHA, Prechtl HFR 1982 The emergence of fetal behaviour. I. Qualitative aspects. *Early Hum Develop* 7: 301-322
2. Vries JIP de, Visser GHA, Prechtl HFR 1985 The emergence of fetal behaviour. II. Quantitative aspects. *Early Hum Develop* 12: 99-120
3. Visser GHA, Laurini RN, Vries JIP de, Bekedam DJ, Prechtl HFR 1985 Abnormal motor behaviour in anencephalic fetuses. *Early Hum Develop* 12: 173-182
4. Prechtl HFR, Nolte R 1984 Motor behaviour of preterm infants. "Continuity of neural functions from prenatal to postnatal life" (Prechtl HFR ed) Blackwell Scientific Publications Ltd, Oxford, England, *Clin Develop Med* 94: 79-92
5. Bekedam DJ, Visser GHA, Vries JJ de, Prechtl HFR 1985 Motor Behaviour in the growth retarded fetus. *Early Hum Develop* 12: 155-166

LANGUAGE DEVELOPMENT DURING THE FIRST FIVE YEARS OF LIFE IN TERM AND PRETERM CHILDREN

Remo H. Largo

Kinderspital, CH-8032 Zürich, Switzerland

While the overall development of premature children has been studied extensively by means of developmental and intelligence testing (review article see 8), language development has been underinvestigated in this population (6). Since prematurity is a major risk factor leading to developmental disturbances in postnatal life (5), and delayed early milestones of language development have been postulated as a sensitive indicator of developmental disability (e.g. 1), language development in prematurely born children is of particular interest. Prematurely born children are reported to be mildly delayed in language development when compared with full-term populations (e.g. 7). One of the possible causes for this delay might be an organic cerebral lesion. None of the past studies on language development in preterm infants has the portion of neurologically impaired children included and the degree of neurological impairment taken into consideration. In our study, language development was investigated in neurologically unimpaired and impaired preterm infants separately (3). The former were mildly delayed in their early language development, performed slightly less well in the Illinois test of psycholinguistic abilities and showed more articulation defects at age 5 in comparison with the term

group. This delay was comparable to that observed in the early development of locomotion in neurologically unimpaired preterm infants (2). Infants with mild to moderate cerebral palsy showed a consistent delay in their language development and had more articulation problems at age 5. Language development in preterm infants might be impaired because they are genetically slightly deviant and/or experienced adverse events in early pregnancy. Complications during later pregnancy, delivery or the neonatal period may lead to impaired cerebral functioning, resulting in a language delay. Finally, unfavourable environmental conditions may have a negative effect on language development. Multiple minor malformations, possibly indicating mild genetic deviances or adverse events in early pregnancy, were significantly more frequent in the preterm than in term infants. However, a significant relationship between the frequency of minor malformations and language development could not be established in the preterm group. Minor genetic deviances and/or minor adverse events in early pregnancy did not seem to have a strong enough impact on the developing brain to delay language development significantly.

The perinatal optimality score (POS), a measure for optimality of pregnancy, birth and the neonatal period, was significantly negatively correlated with language development. Our results indicate a more pronounced effect of adverse perinatal events on motor functioning than on the processes of language comprehension and expression. Gestational age and birth weight were consistently correlated with language performance, a finding which could only partially be explained by the relationships between gestational age, birth weight and POS. It is tempting to speculate that, before term, presently unknown factors, e.g. of metabolic origin, might have a negative impact on early extrauterine brain development.

Socio-economic status (SES) and birth order had an age related influence on language development in term and much less in preterm children. In contrast to previous studies (e.g. 7, 9) the significance of SES in our preterm group was marginal, while perinatal factors exerted a considerable effect on their language development. We assume that the most homogeneous and better socio-economic conditions in our country than for example in the United States or England led to our finding that perinatal factors have a greater impact on language development than has previously been reported.

Acknowledgements: The collaboration of Dr L Molinari, Dr M Weber, Dr L Comenale-Pinto is gratefully acknowledged.

This work was supported by the Swiss National Science Foundation Nr 3988-0.84.

References:

1. Coplan J et al 1982 *Pediatrics* 70:677
2. Largo R H 1985 *Develop Med Child Neurol* 27:183
3. Largo et al 1986 *Develop Med Child Neurol* (in press)
4. Prechtl HFR 1980 *Early Hum Develop* 4: 201
5. Reed DM 1977 Baltimore: Urban&Schwarzenberg
6. Rocissano L, Yatchmink Y 1983 *Child Development* 54:1229
7. Siegel LS 1982 *Child Development* 52:545-557
8. Stewart AL 1981 *Lancet* i:1038
9. Wright NE 1983 *Brit J Disord Communic* 18:187