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Does growth hormone therapy improve motor development in infants with Prader-Willi syndrome?

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In infants with Prader-Willi syndrome (PWS), only milestones of development have been retrospectively assessed so far [2, 7]. In our study on growth hormone (GH) treatment in young children with PWS, we found a typical pattern of psychomotor retardation with these children being more retarded on the 'locomotor' and the 'hearing and speech' scale than on the other scales. Under GH treatment, motor development improved significantly, while speech development did not.

The issue of GH treatment in young children with PWS originally arose for two reasons. On the one hand, paediatricians and neonatologists are now aware of the clinical picture of PWS in neonates (muscular hypotonia, feeding problems and development delay) and genetic diagnostics are available to confirm PWS, so that an increasing number of infants is diagnosed. On the other hand, several studies have reported favourable effects of 6–12 months GH treatment on growth, fat and muscle mass, as well as physical performance in older children [3–5].

Since there is some evidence that symptoms of GH deficiency are already present in infants [6], we treated ten children with genetically confirmed PWS under 2 years of age with GH (18 U/m^2 per week, corresponding to ca. 0.025 mg/kg per day) and studied psychomotor development by means of the Griffith test. Results of growth and body composition have already been published in part [5]. The Griffiths test was used in the German edition [1] and performed before and after 6 and 12 months of therapy.

Baseline examination revealed a particular developmental pattern which could be typical of PWS. On the 'locomotor' and 'hearing and speech' scales, the children were significantly more retarded than on the other scales. Locomotor capabilities increased significantly during GH therapy, whereas 'hearing and speech' remained unchanged. Unfortunately, no prospective studies on psychomotor development in untreated infants with PWS have been published as yet. It cannot be excluded that muscle hypotonia in PWS improves spontaneously with increasing age and, consequently, could contribute to the observed changes of motor development under GH therapy. The treated children, however, started walking freely at an average age of 24.1 months, whereas in untreated children, the corresponding age reportedly lies at 28–32 months [2, 7]. Development of motor capability therefore seems to be improved by GH therapy, possibly due to the muscle anabolic effect of GH [3, 5].

Furthermore, speech capabilities were compromised as early as in infancy. In contrast to motor development, no improvement under GH therapy was found. We therefore conclude that the speech disorder is not related to muscle hypotonia. The degree of the 'locomotor' improvement and the long-term outcome have to be determined in prospective studies with untreated PWS controls.

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Table 1 Griffiths test in young children with PWS. Statistical significant differences by Wilcoxon tests: **·***$P < 0.01$ or $P < 0.05$, respectively, versus Developmental Quotient A at the same time, and *$P < 0.05$ versus the respective DQ before therapy

Developmental quotient (mean ± SEM)	Before therapy	GH therapy	
		6 months	12 months
n =	10	8	8
A Locomotor scale	43.2 ± 6.5	55.2 ± 7.4*	57.8 ± 5.9*
B Personal-social scale	62.1 ± 4.1**	66.2 ± 2.7	65.1 ± 2.0
C Hearing and speech	50.9 ± 2.9	54.4 ± 3.1	52.4 ± 1.5
D Hand and eye development	64.4 ± 2.6***	67.6 ± 3.1*	62.9 ± 3.5
E Performance	61.4 ± 4.2*·**	69.3 ± 3.0**	64.2 ± 2.8