

University of Groningen

Infants at very high risk of cerebral palsy

Hielkema, Tjitske

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2017

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Hielkema, T. (2017). *Infants at very high risk of cerebral palsy: a challenging population*. [Thesis fully internal (DIV), University of Groningen]. Rijksuniversiteit Groningen.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

LETTER TO THE EDITOR

TIME TO UPDATE THE GROSS
MOTOR FUNCTION CLASSIFICATION
SYSTEM (GMFCS) FOR EARLY AGE
BANDS BY INCORPORATION OF
ASSISTED MOBILITY?

T. Hielkema
A.G. Boxum
E.G. Hamer
J.H.B. Geertzen
M. Hadders-Algra

Pediatric Physical Therapy 2017; 29:100-101.



We recently questioned how to classify young children with severe forms of cerebral palsy (CP) according to the Gross Motor Function Classification System (GMFCS).^{1,2} The issue arose from the introduction of assisted mobility at an early age. The following case serves as an example.

A 22-month-old girl had a history of prematurity and cystic periventricular leukomalacia. The girl fulfilled the clinical criteria for bilateral spastic CP, including a stereotyped posture and motility, hypertonia, more pronounced in the legs than in the arms, and exaggerated reflexes. She was not able to roll from the supine to prone positions or reverse. In the prone position, she did not bear weight on her arms, but she was able to lift her head from the surface for a very short period, although she did not succeed to maintain her head lifted. The girl was not able to sit independently, but with trunk support, she was able to look around and move her head in different directions. She was able to balance her head in supported sitting position, but she was not able to maintain her head against gravity in the prone position, and not able to roll. She fulfilled the criteria of GMFCS level V ("physical impairments limit voluntary control of movement. Infants are unable to maintain antigravity head and trunk postures in prone and sitting. Infants require adult assistance to roll"), than those of GMFCS level IV ("infants have head control but trunk support is required for floor sitting. Infants can roll to supine and may roll to prone"), according to the classification before the second birthday.

However, the girl had used a manual wheelchair for a month. In the wheelchair, the girl was able to move around by herself, at home and in the clinic, and showed goal directed, voluntary locomotion. In terms of functional mobility, this means that she was able to move independently indoors. Using the general age-independent rules to determine the GMFCS level, this would mean that the girl fulfilled the criteria for GMFCS level IV: "Self-Mobility with Limitations; may use Powered Mobility." The GMFCS also states that the distinction between levels IV and V is based on rules for independent mobility: "Children and youth in Level V have severe limitations in head and trunk control and require extensive assisted technology and physical assistance. Self-mobility is achieved only if the child/youth can learn how to operate a powered wheelchair." According to this decision rule, the girl's gross motor function also would be better classified as a GMFCS level IV.

Our case illustrates that the introduction of assisted mobility in children with CP before the age of 2 years may result in difficulties in determining the appropriate GMFCS level, as the general criteria for the distinction between levels IV and V do not match the criteria of the GMFCS before the second birthday. The beneficial effect of wheeled mobility at an early age is increasingly acknowledged. Being able to move around and explore the environment is associated with a positive effect on development.^{3,4}

We therefore propose to adapt the criteria for GMFCS level IV for children younger than 2 years in the following way: "Infants have head control but trunk support is required

for floor sitting. Infants may roll to supine and prone. Children may achieve self-mobility using a manual or powered wheelchair.” For level V below age 2 years, we recommend the following adaptation: “Physical impairments limit voluntary control of movement. Infants are unable to maintain antigravity head and trunk postures in prone and sitting. Infants require adult assistance to roll. Some children achieve self-mobility using a powered wheelchair with extensive adaptations.” It is known that the accuracy of the GMFCS classification is lower before the second birthday.⁵ Conceivably, the suggested adaptations may result in a higher stability of the higher GMFCS levels from early age onwards.

REFERENCES

1. Palisano R, Rosenbaum P, Walter S, Russell D, Wood E, Galuppi B. Development and reliability of a system to classify grossmotor function in children with cerebral palsy. *Dev Med Child Neurol.* 1997; 39:214-223.
2. Palisano R, Rosenbaum P, Bartlett D, Livingston M. GMFCS–E&R. Hamilton, Canada: CanChild Centre for Childhood Disability Research, McMaster University; 2007.
3. Bornstein MH, Hahn CS, Suwalsky JT. Physically developed and exploratory young infants contribute to their own long-term academic achievement. *Psychol Sci.* 2013; 24:1906-1917.
4. Livingstone R, Field D. The child and family experience of power mobility: a qualitative synthesis. *Dev Med Child Neurol.* 2015; 57:317-327.
5. Gorter JW, Ketelaar M, Rosenbaum P, Hadders PJ, Palisano R. Use of the GMFCS in infants with CP: the need for reclassification at age 2 years or older. *Dev Med Child Neurol.* 2009; 51:46-52.

