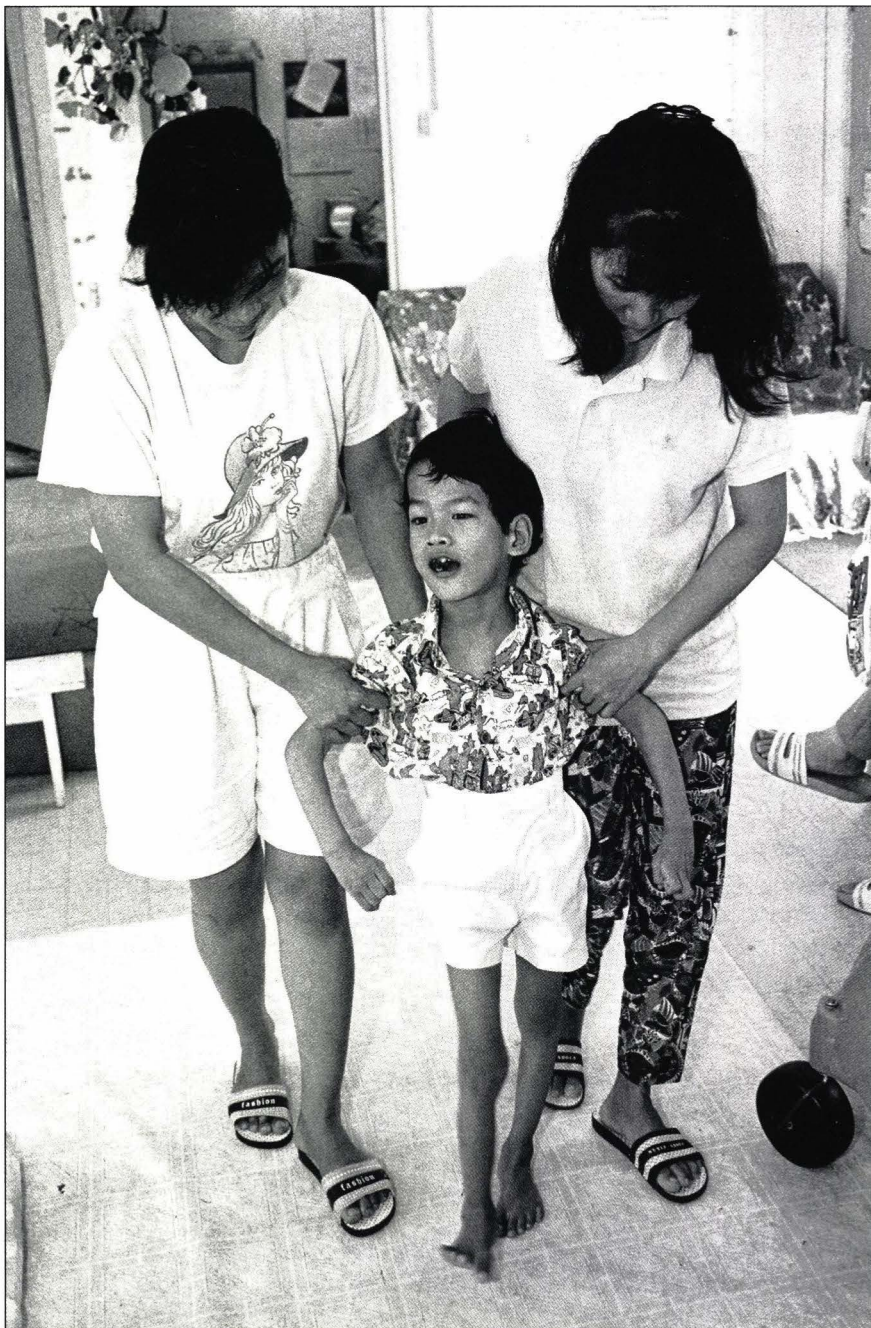


# Cerebral palsy

Adriano Ferrari



*A child with cerebral palsy learns to walk.*

Everywhere in the world, out of every 1000 live births, between two and three babies will suffer from cerebral palsy. Such babies used to be known as “spastics”. Cerebral palsy is a complex motor disorder at the level of the central nervous system. It is caused by irreversible brain lesions occurring

before, during or shortly after birth. This condition is therefore clearly influenced by the quality of perinatal care. After a period when there appeared to be a significant reduction in this disorder, the incidence now seems to be on the increase in both developing and industrialized countries – a trend that may be related to

*“Paralysis” for a child with cerebral palsy is not just a problem of movement and perception, but above all “paralysis” of intention, interest and participation. Rehabilitation must be directed towards promoting a balanced interaction between the individual and his or her physical and social environment.*

maternal age, to falling birth-rates and, above all, to the survival of pre-term infants.

The movement disorder is certainly the primary and most evident sign of the paralysis, but it does not always represent the most important aspect and, above all, it alone cannot entirely account for the disability of the child affected by cerebral palsy.

By movement we mean both the “repertoire of gestures” produced at the various sites of our locomotor system and the “patrimony of postures”, that is the reciprocal positioning of the various segments of our body that allows us to stand still, to sit, to crouch, and so forth. While posture represents a fixed configuration of our movement sites, by “gestures” we mean the transition from one posture to another by simultaneous or sequential changes at one or more segments.

In cerebral palsy, there is a reduction in the motor repertoire of gestures and also a loss in the quality

of movement because the motor patterns which are produced are not normal. Similarly, the range of postures which the child can adopt and maintain, as well as their stability, is altered: the child has difficulty in both moving and staying still. The poorer these ranges are, the more severe is the final paralysis and consequently the greater the disability.

The term “adaptation” expresses the child’s capacity to modify motor performance to meet the needs imposed by both body and the environment in order to carry out a determined task. Posture and movement therefore represent continually changeable solutions to the conditions imposed by a developing and growing body, by a constantly renewing environment and by tasks which throughout childhood become progressively more complex.

Paralysis entails a lack of adaptability of gestures and postures:

- in response to the environment, which must be suitably simplified and modified to help the child;
- in relation to the child’s own needs and ability to cope with them, proportional to his or her mental capacity and drive to independence;
- in relation to the body, which in time becomes conditioned and deformed.

“Ability” expresses the child’s capacity to choose and use from his or her remaining repertoire the best solution to the required task. In cerebral palsy, not all the conserved repertoire can be used; above all, the child is not always able to choose the best motor strategy to carry out a required task in a certain context.

Cerebral palsy is primarily a problem of projecting, planning and controlling movement. However, the flaws of the nervous system fairly quickly cause deformity of the locomotor system, as happens with a bad driver when, the more he drives his car, the more he damages it. In turn, the damage inflicted on the child’s locomotor system will inevitably have a negative influence on the motor (movement) solutions avail-

able to the nervous system, just as a damaged car will limit the driver’s possibilities.

Ideally, physiotherapy will be directed towards guiding the nervous system to construct adaptive functions. Physiotherapy must also confront the consequences of the central nervous system’s errors on the motor apparatus. These secondary dysfunctions may necessitate the use of suitable orthoses or orthopaedic surgery, which may need to be carried out more than once as the child grows.

### A problem of perception

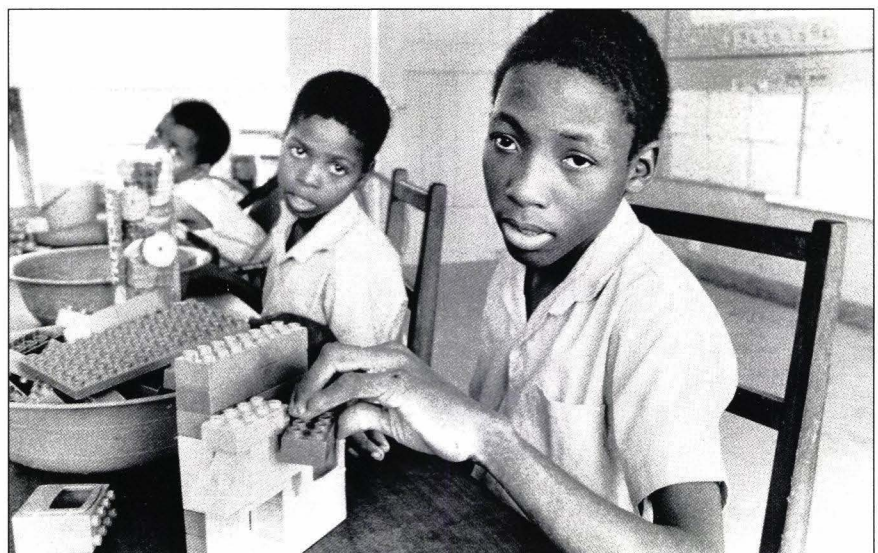
The disability in cerebral palsy is also a problem of perception. Much perceptual information cannot be received or processed by the cerebral palsy child, or else it may be analysed in an excessive or distorted way. In certain children, depth and distance may be overestimated to the point of creating an overwhelming fear of falling; or they may be underestimated to the point where the children cannot perceive how their balance is compromised, leading to continual loss of control of their postures. Phrases like “I’m falling” and “Straighten up” soon become familiar to the cerebral palsy child and the family. Rehabilitation in cerebral palsy therefore cannot be limited to the motor aspect alone, but must also include promotion of

perceptual functions. In many countries, determined efforts are being made to integrate children with cerebral palsy within the ordinary school system. In Italy, for instance, the scholastic and the social integration of the patients is particularly developed, since special schools no longer exist and no differentiation is recognized in the compulsory school system.

“Paralysis” for a child with cerebral palsy is not just a problem of movement and perception, but above all “paralysis” of intention, interest and participation. Rehabilitation cannot be limited to education of movement and perception but must be directed towards promoting a balanced interaction between the individual and his or her physical and social environment.

In order to achieve this goal, two conditions are essential. On the one hand, the child must become aware of his or her own needs and desires and be determined to fulfil them. On the other hand, a sensitive and informed community needs to be capable of accepting and appreciating the diversity of ways in which the child copes with the environment and seeks to express his or her own individuality. ■

*Professor Adriano Ferrari is Professor of Rehabilitation Medicine at the Presidio regionale ad alta specialità per la riabilitazione delle disabilità infantili, Arcispedale S. Maria Nuova, Azienda Ospedaliera di Reggio Emilia, 42100 Reggio Emilia, Italy.*



*Movement training in a special school for children with disability.*