Physiotherapy in the management of cerebral palsy

Jeanne Hartley

While most parents and professionals agree that physiotherapy treatment is beneficial for children with cerebral palsy, evidence as to its efficacy is controversial. Physiotherapy should be seen from the perspective of lifelong management of cerebral palsy and appropriate resources should be identified in adulthood.

In 1853 Little described the condition we now call cerebral palsy (CP). Many definitions of CP have been offered over the years but Bax (1964) defined CP as a non-progressive 'disorder of movement and posture due to a defect or lesion of the immature brain'. The incidence of CP has remained at 2.5 per 1000 live births, but changes in epidemiology are well documented, with an accompanying change in the clinical presentation of CP. Increased survival of extremely pre-term infants or severely asphyxiated full-term infants has led to observations by physiotherapists that such children have low proximal tone and weakness particularly in the trunk accompanied by marked hypertonia in the limbs (Mayston and Murray, 1999). The relationship between short gestation, low birth weight and CP has been demonstrated in numerous studies and these children now make up a sizeable population to challenge the skills of physiotherapists.

Although CP results from a finite cortical injury the peripheral manifestations are progressive with growth. These may include abnormal muscle tone, limited variety of muscle synergies, developing muscle and joint contractures, altered biomechanics, muscle weakness and low levels of fitness. There may be associated epilepsy, visual, communication and intellectual difficulties that may also need to be taken into consideration. The World Health Organization (2002) *International Classification of Function and Disability* not only allows the child with CP to be viewed as an individual but places the child in the context of the environment in which he/she needs to function. Disability is described in terms of impairment, activity limitation and participation restriction. Physiotherapists work predominantly at the impairment level when trying to improve the functional possibilities of a child with CP (Mayston, 2001).

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PHYSIOTHERAPY TREATMENT: THE DILEMMA

Therapy is defined in *The Shorter Oxford English Dictionary* as the medical treatment of disease; curative medical treatment. Thereby lies the problem for physiotherapists working with children with CP and their families: therapy (and treatment) denotes cure. Physiotherapy treatment implies remedy and, very understandably, families want cure or remedy. Bax (2001) suggested that perhaps collusion with the families played some part in professional reluctance to confront parents honestly with views about a child's prognosis.

The use of the term 'management' rather than 'treatment' may help to allay parental dissatisfaction with traditional therapies and help reduce their desire to seek alternative and untried therapies. Bleck (1987) also stated that CP was not treated but managed to allow optimal fulfillment of the child's potential for adult living using a goal- or aim-orientated approach This would often entail special seating, positioning and the use of adaptive equipment. He cautioned that some home therapy schedules may be so time consuming that they may destroy the parent–child relationship because of the busy workload recommended by the therapist. This busy workload may absorb the parent's anger, or the hostility may be increased. Sussman (2001) questioned whether professionals who are involved in the management of CP ever ask their patient or their family what they want in the terms of their ultimate outcome and further stated that lack of such understanding is a critical issue in assessing outcome interventions.

After many decades of intense and sincere effort by physiotherapists to 'treat' CP, most professionals now agree that these remedial efforts have been unsuccessful in achieving function. As early as

1962 Paine queried the value of physiotherapy in the treatment of CP. He compared a group of patients who had no therapy with a group who had intensive physiotherapy, splintage and orthopaedic surgery. Those with mild spastic hemiplegia were found to improve both with and without treatment. Children with more severe spasticity and involvement did have less muscle and joint contractures and better gait patterns with treatment but physiotherapy did not reduce the need for orthopaedic surgery. Physiotherapy for children with athetosis was found not to make a difference. Goldkamp (1984) reviewed the effectiveness of physiotherapy treatments (mainly neurodevelopmental) on functional outcomes and concluded that activities of daily living were not enhanced by regular physiotherapy. The prediction of ambulatory ability is not dependent on access to physiotherapy but to the persistence of primitive reflexes and the inability to sit at the age of 2 years (Sala and Grant, 1995).

Bleck (1987) confirmed that, although 'systems of therapy' had been described, published in journals and been the subject of many conferences and seminars, some data on the effectiveness would be forthcoming. However, most studies have been either questioning or negative. He stated that it was time to give up trying to 'cure' the neurological deficits by remedial methods, stop looking for positive studies, and get on with the task of helping children and their parents in the management of the motor disorder to allow optimal function for daily living.

PHYSIOTHERAPY MANAGEMENT

Physiotherapy management requires the therapist to take on the demanding task of analyst, catalyst and family advisor. The modern therapist needs training and skill in interpersonal relationships and must not disturb the delicate relationships that exist within most families. Physiotherapists work within a team towards a common goal – independence consistent with the extent of the handicap.

Mayston (2001) identified three general aims, depending on the age of the child and the severity of the disability:

- Increase or improve the skill repertoire
- Maintain functional level
- General management and minimization of contractures and deformities.

There are many therapy philosophies to the management of the child with CP. Bobath neurodevelopmental approach, movement opportunities via education (MOVE) sensory integration (SI) and conductive education (Peto) are widely used in the UK. Many children with CP also enjoy hydrotherapy and therapeutic riding. Therapy aims may be achieved by the use of strategies to facilitate function such as orthotics, postural support, pharmacological agents, e.g. botulinum toxin, intrathecal baclofen or orthopaedic surgery to address deformity and enhance abilities.

Awareness that abnormal hip development begins early emphasizes the need for children at risk to have access to 24-hour postural management equipment, e.g. orthotics such as abduction splintage, and specialized seating and sleeping systems. Parents need to be educated about the risks to encourage participation in postural management programmes. Children with total body involvement CP benefit from 24-hour postural control (Association of Paediatric Chartered Physiotherapists, 2001; Pountney et al, 2002).

Many studies have been carried out over the years in attempt to confirm the effectiveness of physiotherapy for children with CP. Bower (1999) stated that physiotherapy for this group of children is full of opinion but there are few facts. She felt that, in the UK, current physiotherapy approaches could be broadly divided into those that emphasize whether a child performs a motor function, those that emphasize how a child performs a motor function and those that include both these concepts. As some children with CP who have received little or no treatment but adequate stimulation still develop and acquire motor skills, Bower suggested that one of the questions which needed to be considered was whether it was possible to accelerate the rate at which of motor skills are acquired with physiotherapy and if so whether the effect is cumulative?

Physiotherapy is not delivered for its short-term effect but for its presumed long-term effect. Bower et al (2001) suggested that increasing the intensity of physiotherapy over a period of 6 months to a group of children with bilateral CP had very little significant advantage over the control group and that any slight advantage was likely to be lost over the subsequent 6 months if treatment reverted to its usual amount.

Mayston (2001) suggested that the best therapy approach and frequency of input has yet to be determined and would, of necessity, be dependent on ability and age of the child. The current literature suggests that important components of therapy intervention should be:

- Maintenance of muscle length
- Attention to muscle strength
- Acceptance of the limitations while not neglecting the potential of the damaged nervous system for positive adaptation and change
- Consideration of the need to prepare for adult life
- Achievable, meaningful and relevant functional goals

- Manageable routine compatible with quality of family life.

Weakness and muscle imbalance have been identified in CP but their aetiologies are poorly understood. The use of strength training to counteract evident weakness in children with cerebral palsy is controversial. Damiano et al (1995) suggested that resistance exercise was an effective treatment strategy and as such should be considered as one component in the habilitation of children with CP.

SURGICAL MANAGEMENT OF CP: THE ROLE OF PHYSIOTHERAPY

CP remains a major clinical challenge to orthopaedic surgeons to reduce the effects of muscle and joint contractures (which tend to increase with growth), improve posture and facilitate seating or ambulation. Decisions regarding orthopaedic surgical procedures should be made, in conjunction with the child and family, by a team of health professionals who has known the family for a period of time. Pre-surgery physiotherapy assessment should provide sufficient information to target areas for intervention, determine the potential for functional improvement, and educate the family in the expectations and rehabilitation needed following surgery. Timing of procedures is important to ensure physiotherapy management, particularly in the immediate postoperative period, is available, especially if physiotherapy teams are based in the community.

WHEN THEY GROW UP

Bottos et al (2001) conducted a retrospective study on a population of adults with CP and concluded that, although CP was considered to be predominately a childhood pathological condition, the evolution of the effects of CP do not stop at 16–18 years of age. Motor performance deteriorated once into adulthood and those who managed to continue to walk as adults deteriorated in terms of the distance they could cover. Contact with health and rehabilitation services is radically reduced once individuals reach adulthood and reduced contact often results in deterioration of the quality of life for adults with CP and their carers. The traditional child-oriented approach, concentrating mainly or exclusively on the achievement of independent walking, is perhaps not the ideal approach for children with CP, suggesting that services for individuals with CP should be planned to encompass an entire life perspective.

KEY POINTS

- Families should be made aware that referrals to physiotherapy are to manage the effects of cerebral palsy (CP) rather than offer treatment.
- It is possible to predict the functional potential for a child with CP at an early age. Children who have not achieved sitting balance by 2 years have a poor prognosis for walking.
- Physiotherapy has a place to play in helping a child with CP to increase or improve their skill repertoire, maintain their functional level and in the general management and minimization of contractures and deformities.
- For children with total body CP, 24-hour postural management will reduce the development of severe deformity and may allow the development of communication and other skills via developing technology.
- Annual hip X-ray surveillance should be carried out at specialist orthopaedic centres on children who are non-ambulatory at 30 months of age.
- Ambulatory teenagers and young adults may benefit from physiotherapy, particularly to advise on joint protection and fitness regimens to improve muscle strength to facilitate the continuation of ambulation into adulthood.
- Services for individuals with CP should be planned to encompass a lifelong perspective.

CONCLUSION

There is a need for therapists to challenge established ideas, which will support or modify current best practice, to ensure the highest quality of life for people with CP regardless of severity. **HM**

Conflict of interest: none.

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