

## **Evidence based practice statement about Neuro-Developmental Treatment (NDT)**

**Paediatric Workshops<sup>1</sup> facilitates and provides post-graduate training in Neuro-Developmental Treatment (NDT USA).** The focus is on providing educational opportunities for postgraduate therapists to learn the theory and principles of NDT, and their clinical application through observation and practice. Paediatric Workshops sponsors Neuro- Developmental Treatment Association Certification courses, conducted by certified Instructors of the NDTA (USA).

**The research focus of Paediatric Workshops includes:** issues of efficacy; the development of appropriate research methodology; and the measurement of family driven functional outcomes for children.

NDT is an advanced 'hands-on' therapeutic approach for children with central nervous system insults that result in difficulties in task related posture and movement control. It is practised by experienced paediatric Occupational Therapists, Physiotherapists and Speech-Language Pathologists. NDT aims for children to achieve their highest functional participation in individually chosen daily skills, using their most efficient movements, that also supports further development of function<sup>2</sup>.

Improvement in functional skills of children with cerebral palsy following intensive periods of NDT intervention, has been reported anecdotally by parents and therapists for some time<sup>3</sup>.

Since the 1990s, the NDTA has actively encouraged therapists to support clinical experience with scientific enquiry in order to continually improve the care offered by this approach to children and adults with neuromotor impairments<sup>4</sup>.

Bain<sup>3</sup> addressed 'The impact of Neuro-Developmental Treatment on the performance of daily living tasks by children with cerebral palsy - pilot studies in measuring NDT outcomes'. The research fulfilled the requirements for Doctor of Health Science at Sydney University, 2011.

Findings included the following:

1. "Many of the research studies that aimed to investigate the impact of NDT were conducted using older NDT concepts and strategies that have since been discarded. Altering 'movement patterns' and 'normalising muscle tone', 'positioning' or sustaining certain positions for a length of time, or working towards 'general development' per se, have been replaced in current practice by a focus on actively working to achieve motor skills required for functional goals (Barry, 2001; Bly, 1991; Breslin & Ryan, 2002; Deluca, 2002; Halfens, 2004; Kerem et al., 2001; Lilly and Powell, 1990; Ottenbacher, 1986; Volman, Winroks, & Vermeer, 2002)"<sup>3</sup>
2. Difficulties inherent in conducting NDT research that have potentially limited the statistical strength of evidence obtained in a number of studies include:
  - Children with CP are a small heterogeneous groups (affects validity of outcomes)
  - Ethical difficulties regarding having control groups
  - NDT is not 'one treatment', but a treatment 'approach'

- Lack of clear operational definitions of NDT (numerous combinations of multiple treatment strategies, dependent upon each child, task and environment)
- The large range of possible functional outcomes / ‘participation’
- Validated outcome measures e.g. motor scales, not sufficiently sensitive to measure small but important functional gains by children with CP
- Determination of role of maturation in outcome gains
- Time to consolidate functional gains post-NDT
- Varied physical & social environments for functional tasks, leading to difficulty in establishing a measurement model that reflects functional change.
- The likelihood of other therapies occurring simultaneously with NDT is high - controlling for other treatment effects can be difficult
- Insufficient NDT research to ‘lead’ research

(Barry, 2001, Campbell, 1989, De Gangi, 1994, Halfens, 2004, Ketelaar, Vermeer, van Beek, Hart & Helders, 2001, Kolobe, Palisano & Stratford, 1998, Mayo, 1991, Ottenbacher, 2001, Siebes, Wijnroks et al., 2002, Sharkey, Banaitus, Guiffrida, Mullens, Rast, Pratt, et al., 2002, as referenced in Bain 2011<sup>3</sup>).

3. There is a small body of evidence of improved function in children with CP after NDT intervention. Specifically, studies that have employed contemporary NDT have produced some positive evidence to support its use.<sup>3, 5-14</sup> (In a more recent study, NDT intervention intensity of 2 – 4 hours direct handling per day for one to two weeks for children with cerebral palsy saw a statistically significant improvement ( $p < .001$ ) in functional skills<sup>15</sup>).
4. “NDT intervention can successfully achieve parent-selected functional goals for children with CP, with maintenance of performance after intervention withdrawal. Portable tri-planar video analysis provided an objective, reliable and child friendly outcome measure to record the relationship between NDT intervention and daily task performance<sup>16</sup>.”
5. “Significant change was found in children’s functional performance of goals related tasks, as measured by GAS scales by both the researcher and the ‘blinded’ CI raters, from baseline to post-test ( $p < .001$ ). Functional ability was maintained over the six week follow up period when intervention was withdrawn<sup>3</sup>.”
6. “In the qualitative outcome measures of the independent variable, the Measures Of Processes Of Care results suggest parents perceived NDT as supporting family centred practice. Similarly, the narrative from both parents and therapists relating to the children’s goal outcomes and their experiences with NDT, were found to be positive<sup>3</sup>.”
7. Intensive Treatment - "In conclusion, a number of studies with a variety of levels of evidence have documented improvement in functional skills in response to intensive treatment, including NDT. Studies where the positive outcomes have either not occurred or not persisted at follow-up have also been documented. Overall, however, the results of the studies cited appear to support the notion that intensity of treatment is an important element in the degree of functional change following therapy".

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