SEN – What’s New?
Friday Keynote

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SEN – What’s New?
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Keynote presentation on the 7th May by:
Sally Goddard Blythe MSc. FRSA
The Institute for Neuro-Physiological Psychology (INPP)
1, Stanley Street
Chester CH1 2LR
Tel.01244 311414
mail@inpp.org.uk
www.inpp.org.uk
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SEN - A New Paradigm
Sally Goddard Blythe

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What is INPP?
INPP was established by Psychologist Peter Blythe PhD in 1975 to research into:
1. Research into the relationship between central nervous system dysfunction and symptoms associated with specific learning disabilities, agoraphobia and panic disorder in adults.
2. Develop reliable methods of assessment
3. Develop effective physical programmes of intervention

The INPP Clinical Programme
Initial Consultation
(Developmental History)
Diagnostic Assessment
Home Exercise Programme
Report reading and written educational report
8 weekly check ups
Duration of programme – approx. 1 year

The INPP Programme for Schools
• Training teachers how to identify children with NDD in the classroom
• Providing a general movement programme to be used with all children but targeting the children with NDD problems (intervention)
• Using the INPP Test Battery and educational measures to assess/measure progress.

INPP Internationally
INPP approved training for practitioners in:
Germany
Italy
Poland
Austria
Switzerland
Finland
South Africa
Training in the use of the school programme:
All of the above and Hungary
Spain
Mexico
Singapore

Children in Hungary doing exercises from the INPP programme for schools

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3. Training in The INPP Method

a) Training for teachers in the implementation of the School Programme (1 – 2 days)

b) Post graduate training in the use of the INPP Method in practice (1 year)

There is nothing in the mind that cannot be seen in the posture
(Kohen-Raz 2003)

Posture or “attitude” reflect not only psychological disposition and mood but also postural ability.
Posture supports all aspects of learning.

Behaviour is language

If a child is unable to match his or her abilities to the demands of the environment, the difference will be seen in behaviour

Learning the first A,B, C…

A = Attention
B = Balance
C = Coordination
D = Developmental Readiness for Education

Why do posture and movement opportunity in the early years matter?

Movement is the medium through which sensory integration takes place

North Eastern Education Library Board, N. Ireland Study 2004

• 48% of P2 children still had traces of retained infant reflexes (5 – 6 years of age)
• 35% of P5 children (8 – 9 years) still had traces of retained infant reflexes
• Higher abnormal infant reflex scores were correlated with lower educational achievement using educational assessments at baseline in P2 children
Building an internal map of body awareness

Adult perception is the result of multi-sensory experiences integrated through the medium of movement.

Reflexes – the primary vocabulary for motor skills and postural control

What are primitive and postural reflexes?

• Primitive reflexes are reflexes that develop in utero;
  • Present at birth in the full term neonate;
  • Inhibited by higher centres in the developing brain in the first 6 months of postnatal life.

What is the significance of primitive and postural reflexes?

Primitive reflexes

Reflexes which emerge in utero, are developed in the full term neonate (40 weeks gestation) and are gradually inhibited and transformed into more mature reactions by higher centres in the brain in the first 6 months of postnatal life.

Postural Reflexes

Reflexes which develop from birth to 3½ years of age and should remain for life.

Beginning with automatic head-righting reflexes, they provide the basis for unconscious control of balance, posture and coordination in a gravity-based environment.

What can primitive and postural reflexes tell us?

The presence of primitive and postural reflexes at key stages in development provide reflections of maturity in the functioning of the central nervous system (neuro-motor maturation). They can be used as tools to:

1. Identify immaturity in the functioning of the CNS (assessment)
2. Indicate type and level of intervention (remediation)
3. Measure change as a result of intervention (evaluation)

Neuro- developmental delay (INPP)

Although the term is used to describe general developmental delay, the INPP definition describes:

The continued presence of a cluster of primitive reflexes and under-developed postural reflexes in the school-age child.

1987 - remediation altered from training movement patterns to inhibit reflexes or develop "higher" movement patterns by replicating normal infant movements and infant sensor experience to give the brain a "second chance" to integrate primitive and postural reflexes.
Examples of reflex related postural and fine motor problems

- W leg position
- Hypotonia in upper body
- When sitting: Possible Symmetrical Tonic Neck Reflex and/or under-developed Head Righting Reflex

Possible Palmar reflex

Factors involved in developmental readiness

- Neurological maturation
- Developmental age in relation to birth date, gestation of pregnancy, gender and
- Environmental opportunity

What part do primitive and postural reflexes play?

**Primitive Reflexes**
Present at birth in the normal full-term neonate. Inhibited in the first 6 months of life as connections to higher centres in the brain become established

**Postural Reflexes**
Develop in the first 0 – 3 ½ years after birth to provide a stable platform for automatic (subconscious) control of posture, balance and coordination in a gravity based environment (adaptation)

Effects of abnormal reflexes on functioning:

- Postural Control
- Balance
- Motor Skills
- Oculo-motor functioning
- Visual-motor integration (VMI)
- Learning
- Emotional functioning
- Behaviour
What is the impact of the above on school performance?

Immature physical skills = un readiness for formal learning

Early signs of immaturity include difficulties with:
- Attention
- Sitting still
- Receptive and expressive language
- Pencil grip (writing)
- Control of eye movements (reading)
- Body awareness (self) and the ability to read and respond appropriately to the body language of others.
- Coordination – using a knife and fork, catching a ball etc.
- Immature behaviour including poor impulse control, ability to take turns etc.

Asymmetrical Tonic Neck Reflex

**Effects if retained:**
- Balance
- Crossing the midline – bilateral integration
- Crawling on the stomach
- Hand-eye coordination - handwriting
- Horizontal tracking - reading
Symmetrical Tonic Neck Reflex in flexion and extension

- Flexion – when the head flexes, the arms bend and the lower body extends
- Extension – when the head extends, the arms straightens and the lower body bends

Symmetrical Tonic Neck Reflex

**Effects if retained:**
- Posture - sitting and standing
- Upper/lower body integration - swimming
- Attention/concentration
- Hand-eye coordination
- Slow visual accommodation – copying, catching a ball
- Vertical tracking

Head Righting Reflexes

**Functions:**
- Automatic righting of head position on body
- Positional change
- Postural adjustment
- Adaptation of muscle tone
- Link to control of eye movements (VOR)

Head Righting Reflexes

**Labyrinthine HRR’s:**
- Respond to changes in head position to correct head position to the midline irrespective of body position. This provides a reference point for control of eye movements

**Oculo-HRR’s:**
- Respond to visual cues.

Examples of absent HRR to the right

Correct head alignment provides the platform for centres involved in the control of eye movements such as:

- Visual tracking (Reading)
- Hand-eye tracking (Writing)
- Convergence (Reading and writing)
- Accommodation (Copying, judging speed and distance)
Why use a physical programme to improve cognitive performance?

Disorders of movement control are a feature of many specific learning difficulties:

• Dyspraxia/Developmental Coordination Disorder – visualisation, ideation and organisation/execution of movement (Ayres)
• Dyslexia – orientation, direction and sequencing of slow movement (Levinson, 1979, Blythe, McGlown 1979)
• Attention Deficit Hyperactivity Disorder – inhibition of movement and inadequate inhibition of arousal to competing sensory stimuli.
• Autistic Spectrum Disorders – perceptual integration and coherence.

Testing children in Schools:

• Children who are delayed in their physical development need more time involved in general physical activities before being ready to integrate fine motor and visual integration tasks

1. 1 Leg Stand
   3 ½ - 4 years – 8 seconds

2. Thumb and finger opposition
   5 years

3. Crossing the midline
   4 years

Examples of testing reception children with permission of Battle Hill School, North Tyneside

St Margaret Mary School, Carlisle
DVD produced by www.youthsporttrust.org

Use of INPP Neurological Tests and the Draw a Person Test

1. The INPP battery (7 years +) yields a possible total score /40.
   0/40 = no abnormality detected
   40/40 = 100% dysfunction on all tests (neurological dysfunction)
2. The Draw a Person Test yields a percentile score (PS) or a mental age (MA).
   Results of both tests can be compared before and after intervention to assess the impact on non-verbal performance

Draw a Man Test (Goodenough)
St Margaret Mary School, Carlisle. Child 1

Age range 8 - 10
June 2001
Neurological Score 21/40
Percentile Score 14
St Margaret Mary School, Carlisle.
Child 1

October 2002
Neurological Score: 2/40
Percentile Score: 77

Draw a Man Test. St MM School, Carlisle

June 2001
Age range 8 - 10

Neurological Score 23/40
Percentile 68

Draw a Man Test: 2nd assessment
St Margaret Mary School, Carlisle

October 2002
Age Range 8 – 10 years

Neurological Score 3.5/40
Percentile Score 99

Draw a Man Test
St Margaret Mary School, Carlisle

June 2001
Neurological Score 28/40
Percentile Score 4
October 2002
NS: 4/40
PS: 68

Draw a Person
Kingstanding EAZ

June 2001
Neurological Score 17/40
Percentile Score 4
October 2002
NS: 2.5/40
PS: 68

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**Research Questions**

1. Is Neurological Dysfunction (a cluster of abnormal reflexes > 25%) a significant factor in children who are under-achieving?

2. Does Neurological Dysfunction respond to a specific programme of developmental exercises carried out in school every day for a minimum of one academic year?

3. Is there a cross-over from change in neurological status to improved performance in educational measures such as reading, spelling and drawing?

**North Eastern Education Library Board, Northern Ireland (2004)**

**Aims**

1. To determine whether retained reflexes were present in children in mainstream schools.
2. To determine whether retained reflexes predicted poor educational progress.
3. To determine whether retained reflexes responded to the INPP Developmental Movement Programme.
4. To evaluate the effectiveness of the programme by measuring the educational progress associated with undertaking the prescribed exercises.

The programme was evaluated for children who had:

a) high levels of retained reflexes and who were underachieving educationally (the criteria for which the programme was designed), and

b) for all children, regardless of their reflex or educational scores.

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**NEELB 2004 - Methods**

- Total number of participants: 663
- Measures of retained reflexes, balance, educational ability and concentration/coordination were made in a controlled study of P5 (8 – 9 year olds) children in seven Northern Ireland primary schools at the start (September 2003) and end (June 2004) of the school year. In each school one P5 class undertook the exercises and the other did not. (324 children)
- Two P2 (4 – 5 year olds) classes in each school also participated in the research. None of the P2 classes undertook the exercises, and the extent to which the presence of retained reflexes at the start of the school year can predict educational progress at the end of the year was assessed. (339)
- The following conclusions were drawn.

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**NEELB 2004 Results - identification**

- 35% of P5 children and 48% of P2 children showed elevated levels of retained reflexes at the first assessment.
- 15% (49) of P5 children had a reading age below their chronological age. Of these, 28 also had elevated levels of retained reflexes.
- Elevated levels of retained reflexes were correlated with poor educational achievement at baseline.
NEELB Results P2’s - identification

- Retained reflexes were correlated with poor cognitive development, poor balance and teacher assessment of poor concentration/coordination in P2 children.
- Neurological scores and teacher assessment at baseline predicted poorer reading and literacy scores at the end of the study.

NEELB Results P5’S - intervention

- Children who undertook the exercise programme showed a statistically significant greater decrease in retained reflexes than children who did not undertake the exercises.
- Children in the INPP group showed a highly significant improvement in balance and coordination, and a small but statistically significant increase in a measure of non-verbal cognitive development (Draw a Person Test) over children who did not undertake the exercises.
- No difference was found in reading, handwriting or spelling in children who were already achieving at or near their chronological age, but for children with high levels of retained reflexes and a reading age below their chronological age, those who undertook the exercise programme made greater progress in reading.

Northumberland Project 2006-2008

Incidence of abnormal reflex in mainstream schoolchildren

1. 52 children aged 7 – 8 years.
2. 25 children aged 4 – 6 years.

Percentage of sample scores of >25% on tests for retained reflexes in both age groups.

Northumberland Project 2006-2008

52 children were divided into 2 intervention groups:
1. INPP group
2. Activate (general movement programme)

Due to unwillingness amongst teachers to include a non-intervention (control) group, this project did not include a control group.

St John’s School, Reading 2006-2008

Participants:
- 12 subjects identified as poor readers using the Salford Sentence Reading test before and after intervention (1 year)
- 6 subjects testing for abnormal reflexes using The INPP Developmental Test Battery for Schools

Results:
1. Are abnormal reflexes present in a group of 6 children identified with under-achievement in reading, spelling and writing? Yes: every child in the INPP group had a total score of >25% on tests for the ATNR, STNR and TLR.
2. Is there a reduction in reflex scores in the INPP group between Time 1 and Time 2? Yes: the reflex scores of all children in the INPP group decreased between Time 1 and Time 2.

St John’s School, Reading.
12 participants: 6 in INPP (intervention group); 6 in remedial reading only.

- Do children in the INPP group have a greater increase in reading scores than those in the comparison group?
- Yes - F(1,10) = 34.40, p < .001 (see Figure n)
- When the progress of both groups of children over the 3 term period from September to September was compared using the Salford Data available - The INPP group made an average gain of 22.5 months in reading compared to a gain of 8.5 months in the comparison group.

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Evolution in the modern age

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Published resources:

Released 2004
An evaluation of the pilot INPP movement programme in Primary Schools in the North Eastern Education and Library Board, Northern Ireland”. 2004 prepared by Fiona Fylan, Brain Box Research Ltd for the North Eastern Education and Library Board

Published 2005.
“Releasing educational potential through movement – A summary of individual studies carried out using The INPP Developmental Test Battery and Exercise Programme for use in Schools”. Goddard Blythe SA. Child Care in Practice.11/4:415-432

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Further Reading

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