Why we do what we do?

The goal of intervention
- Reflection on evidence based practice
- What evidence is there?
- Are there alternatives/ surrogates?
- Signposts for the future

PARTICIPATION
- Child/adult and family/social/occupational context

Optimise
- Neurological
  - Growth & development: nature vs nurture
- Biomechanical
  - Muscle activity/length
  - Skeletal integrity
  - Sensation/cognition etc

Minimise residual disability

Tools of therapy/intervention based on Mayston, 2007

- Training functional tasks:
  - Optimal task performance; maximum participation
  - Practise and training: home activities
- Specific training:
  - Driving neuroplastic change
  - E.g. CIMT, treadmill, robotics, Wii, VR, imagery
- Muscle activation & strengthening
  - Facilitation, FES, repetition, loading, weight bearing, resistance

- Sensory, perceptual & cognitive function
  - E.g. Sensory integration, education, neuropsychology

- Social/behavioural
  - Participation, communication: AAC, recreation, sport

- Maintain muscle length:
  - Prevent secondary MSK problems
  - Tone reduction/hands on/off, taping, orthotics, equipment, surgery, BotNTA
- Train postural reactions:
  - Specifically and as part of task

Cardiovascular & general fitness
- Exercise physiology
- Nutrition/diet
- Sport recreation

Evidence from systematic research
- Patient/client preference
- Empirical evidence

Clinical expertise
- Evidence from systematic research
- Experimental evidence

"analysing, synthesising, and evaluating the best available evidence and integrating it with individual expertise and service users needs…….." Frontline, 05.10.11; see Sackett 1997

EBP

Based on Sackett 1997, in Brown et al 2004

Client perspective

Evidence from systematic research

Therapist's expertise
Why we do what we do…….

Therapy specific

Maximise activity/participation; minimise residual impairments

Management Interventions

Evidence……… what is there?

- Experimental studies: RCT, A-B-A etc
- Single case studies
- Systematic reviews:
  - Morgan et al 2016: early intervention
  - Novak et al 2013: CP interventions
  - Franki et al 2012: CP interventions as per the ICF
  - Antilla et al 2008: CP interventions based on RCTs
  - Kruijsen-Tempstra et al: parental perspectives of PT/OT

Reflections on Novak et al 2013 (265 citations to date):

- Evidence alert system easy to ‘use’ - but an oversimplification and can lead to misuse. 16% green; 58%/20% orange & 6% red (stop)
- Some interventions not interventions e.g. hip surveillance, many not therapy specific.
- Mixed type of evidence used for the review
- ‘Systems’ compared to single intervention
- No reference to GMFCS levels
- No reference to age and stage of development

Novak et al 2014:

- A summary of evidence not a clinical ‘cook-book
- Systematic reviews can aid, but never replace, sound clinical reasoning

What theory/knowledge can be useful:

- Typical development
- Muscle physiology and biomechanics
- Motor control/learning theory
- Neuroplasticity

Continual review of current practice and theory through regular review of literature.
Typical development
Not about:
- aiming for normality/typical performance (Rosenbaum & Gorter 2011)
- following the usual sequence of development
Relevance:
- inter-relationship of different aspects: cognitive, motor, sensory, perceptual, behavioural, social
- reference point; individuality
- understanding essential elements underlying activities
- 3 main areas: Mobility, communication, manipulation/arm support
- ideas for intervention

2 Current knowledge/frameworks/clinical guidelines
Muscle physiology and biomechanics

Adaptability of muscle: effects of health disorder
Muscle fibre stiffness: altered contractile properties (Barrett & Lichtwark, 2010; Lieber & Frieden 2002; 2003; Smith et al 2011; 2012). The balance between the development of muscle fibres and of the extracellular matrix in muscle appears to be determined by the interaction of neuronal, mechanical, and growth factors (Gough & Shortland, 2012).

Neuroplasticity is probably our greatest ally:
Neuroplasticity is activity dependent, and is present throughout life. See Johnston 2009; Ruff et al 2013; Kolb & Gibb, 2014

Motor control/learning: Information processing model
Idea
Need
Desire
Motivation
Execution
Feedback
Feedforward
Adjust
Appraisal
During the task
Command to muscles
Sensory feedback

“...one can only control what one senses...” McCloskey & Prochazka, 1994


The International Classification of Functioning, Disability and Health (ICF) 2001

Extended to ICF-CY (2007)
Clinical tool: Communication with families

The International Classification of Functioning, Disability and Health (ICF) 2001

Clinical tool: education

Important for environmental considerations e.g. architect.

Clinical tool: Service planning/delivery

Considers personal/cultural factors

Clinical reasoning tool

Clinical tool: what level(s) to work at

Clinical assessment/outcome measure tool

Clinical tool: Communication


Clinical tool: communication Between professionals

Clinical tool: research

Important link to FCS

Environmental Factors

Personal Factors

Contingent Factors

Environmental factors

Personal factors

Contingent factors

MJM. 2007

Health condition: CP, stroke; MS, etc

What the person can/cannot do

Objective tests of motor performance

Use of outcome measures

Activity limitation

Participation restriction

Impairments

Detailed knowledge of impairments

Neuromuscular

Musculoskeletal

Sensory and other systems

Cognitive etc

Neuromuscular system

Musculoskeletal system

Somatosensory and perceptual

Cognitive

Cardiovascular/respiratory

Gastrointestinal system

2. Current knowledge/frameworks/clinical guidelines

Child’s age and classification:

GMFCS/MACS/CFCS/EDACS

Level of care

Level of care

Activity and participation limitations & restrictions

What the child can and cannot do: How and why

Body structure & function

Activity

Participation

Activity limitation

Participation restriction

What is it the child cannot do or does not do efficiently?

Barriers to societal integration

Environmental factors

Personal factors

Practice firmly embedded within ICF and the functional classifications (GMFCS; MACS; CFCS; EDACS).

ICF = Outcome measurement tool

Thomason, Rodda, Willoughby, Graham, 2014
2. Current knowledge/frameworks/clinical guidelines


Practice guidelines: based on evidence and expert opinion

https://canchild.ca

3. Client i.e. child and family perspective


Evidence from systematic research and consideration of current knowledge, frameworks, guidelines.....

Therapist’s expertise

Service delivery: Family/child centred service

(see Rosenbaum & Gorter 2011; CanChild2003)

- Family = essential environment of the child
- Parents are the central ‘contextual’ factor in their children’s lives
- Each family/child is unique
- The family is the expert on the child’s abilities and needs
- Work with families/child to identify their goals
- Provide variable supports for families as needed

AND:
- Educate as to what therapy is............

Parents: know their children best; want the best (King et al 2004)

Early intervention:
- Limited understanding of what works
- EI should focus on “supporting a reliable and responsive parent-infant relationship, reducing infant stress, supporting the infant’s self-regulation, and consideration of next developmental steps......... Should focus on parental well-being” Van Wassenaar-Leemhuis et al 2016
### The ICF framework and interventions:

<table>
<thead>
<tr>
<th>Body Structure &amp; Function /Impairments</th>
<th>Activity/ limitations</th>
<th>Participation/ restrictions</th>
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</thead>
<tbody>
<tr>
<td>1. Neuromuscular system</td>
<td></td>
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<tr>
<td>• Tone</td>
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<tr>
<td>• Balance</td>
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<tr>
<td>• Patterns of movement</td>
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<tr>
<td>2. Musculoskeletal system:</td>
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<tr>
<td>• Muscle strength</td>
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<td>• Range of movement</td>
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<td>3. Somatosensory and perceptual</td>
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<td>4. Cognitive</td>
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<tr>
<td>5. Cardiovascular/respiratory</td>
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<tr>
<td>6. Gastrointestinal system</td>
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</tbody>
</table>

#### Components of therapy

- **HANDS-ON THERAPY**
  - CIMT
  - Task training
  - Treadmill training
  - Strengthening
  - Stretching
  - BoNTA

- **ASSISTED PRACTICE**: hands-on robotics, TTWPBWS etc.
  - Practice walking between class rooms: to school bus
  - Stretching
  - Strengthening

- **Therapy intervention e.g. Bobath/NDT**
  - Train balance reactions

- **Environmental factors**
  - **Personal factors**

#### Signposting for the future

**GMFCS = the ‘rough guide’ to therapy?**

- Little participation restriction: some activity limitation GMFCS I & II
  - Work with the persons own activity to maximize potential

- Moderate level of activity limitation/ participation restriction GMFCS III
  - “Hands on”: use of adjuncts assisitve devices/ postural management

- Significant activity limitation: very significant participation restriction GMFCS IV & V

#### Signposting for the future

**Why we do what we do? Comments & FAQs**

- CP cannot be cured, CP cannot changed- can be modified
- Signs and symptoms will change over time because of the developmental processes
- Refer to experimental evidence and continually review
- Continual update of knowledge
- Implementation of the ICF
- Family Centred
- Reference to expert guidelines
- What works?
- What works best for different types of CP/neurodisability and at what stage/age the intervention is most effective
- How often? How much?
- What about the future? Infants become children; children become adults

**Signposting for the future**

**The “blank” sheet approach……….**

“...What would it be like if the ‘neurophysiotherapy treatment strategies memory’ was erased and we all had to design a therapy contribution to habilitation/ neurorehabilitation from scratch? I think it is an exciting idea and one that should be taken seriously ……..

“We all want to deliver best practice—what is the best way to design that?” It might mean that we need to take a blank sheet, then draw on our knowledge, experimental evidence, clinical expertise, client preference and goals, work out what financial and human resources we have, and design a service which takes all of these into account. Rather than being concerned about what approach we might use, we will continue to focus on the client and their needs and goals.” (Margaret Mayston, ACPIN, Synapse, Autumn, 2009)
Why we do what we do?

Happy families & happy participating children/adults