Upper limb weakness practical management & areas for research

‘A complex intervention’

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12th June 2013
Cochrane reviews Interventions to improve upper limb function after a stroke

- CIMT – Sitori et al, 2009
- Mental practice – Barclay Goddard et al, 2011
- Virtual reality – Laver et al, 2011
- Mirror therapy - Thieme at al, 2012
- Hands-on therapy - Winter et al, 2011
Cochrane reviews
Interventions to improve upper limb function after a stroke

- Repetitive task training - French et al. 2007
- EMG biofeedback – Woodeford et al, 2007
- Simultaneous bilateral training – Coupar et al 2010
- Home based therapy – Coupar et al 2012
- Electrostimulation – Pomeroy et al, 2006
RCP stroke guidelines 2012

- CIMT
- Mental imagery
- Bilateral retraining

- Consider
- Mental practice
- Robotic treatment
- Repetitive task training
- Virtual reality
Principles of experience-dependent neuroplasticity

- Use it or loose it
- Use it and improve it
- Be specific in treatment choice
- Repetition matters
- Intensity matters

- Time matters
- Salience matters
- Age matters
- Aim for transference
- Be careful of interference

Constraint induced movement therapy

Constraint-induced movement therapy (CIMT) aimed at improving arm function should only be offered to patients who have 20 degrees active wrist extension and 10 degrees of active finger extension, and only if the treating team has the necessary training and the patient is expected to Participate fully and safely.

RCP Stroke guidelines 2012
Constraint induced movement therapy

What does it take to use evidence based practice?
Electromechanical devices

SIGN 118 - `Electromechanical/robotic devices may be considered to improve arm motor function and motor strength in selected patients where the necessary equipment is already available and healthcare professionals are competent in the use of the equipment`  
Mental practice

Mirror box therapy

Thieme H et al. Mirror therapy for improving motor function after stroke. Chchrane database of Systematic reviews 2012, issue 3 Art No.: CD008449. DOI:10.1002/14651858. CD008449.pub2

Emerging ideas for research

- Functional Strength training
  - Harris
Splinting: recommendations

Any patient who has increased tone sufficient to reduce passive or active movement around a joint should have their range of passive joint movement assessed and monitored.

‘Splinting of the arm and hand should not be used routinely after stroke’ RCP 2012

Upper limb orthotics after stroke

- Systematic review
- 4 trials – 126 participants (all had custom made thermoplastic splints applied to the wrist, fingers and/or thumb to maintain or improve joint range and prevent contracture
- Results – upper limb orthoses showed no effect on upper limb function, range of movement at the wrist, fingers or thumb, nor pain
Emerging ideas for research

Saeboflex® - functional dynamic orthosis
Emerging ideas for research

Saeboflex®

Stuck R & Marshal L.
SaeboFlex Upper Limb Training in Acute Stroke Rehabilitation: Feasibility Study

Emerging ideas for research
Myo-EX sensors use surface EMG for computerised exercise, biofeedback, muscle re-education and motor control.
Initial measures of upper limb function and impairment were found to be the most significant predictors of upper limb recovery.

- Coupar F et al. (2008) predictors of upper limb recovery following stroke: A systematic review. European stroke conference, 2008, Nice, France
Predicting recovery

‘The presence of intact cortico-spinal tracts (that are required for independent finger movement) within the first month after stroke as the most reliable indicator of recovery of dexterity at 6 months’

- **Beebe JA et al** – Active ROM predicts upper extremity function 3 months post stroke. Stroke. 40 p1772-1779
A Delphi study of light retrograde massage for post-stroke upper limb oedema

Aim - To identify current clinical practice, and opinion of occupational therapists about the treatment (specifically light retrograde massage) of post stroke upper limb oedema

Post-stroke hand oedema
Clinical features

- More common in those with severe disability, hypertonic fingers and reduced sensation
- Can lead to restriction of mobility and function
- Altered appearance
- Psychological / social impact
Reasons for study

- Light retrograde massage (LRM) is often reported in clinical practice as an intervention for post stroke hand and arm oedema
- There is limited scientific evidence for the assessment and treatment (including LRM) of post stroke upper limb oedema
- Consider the economic impact of the use of therapy time to provide an intervention which lacks a robust evidence base
- Seek to support or refute its effect as an intervention in future trial work
Data Analysis

- Round 1 – Thematic analysis
- Round 2 - Statistical analysis using SPSS (version 16)
  - Collapse extreme categories of agreement and disagreement
  - Non parametric test : one sample
  - Chi-square goodness of fit
  - p <0.05 to determine consensus for any statement
## Results - Use of LRM for the reduction of post-stroke upper limb oedema

<table>
<thead>
<tr>
<th>Question 1</th>
<th>A n</th>
<th>D n</th>
<th>Chi²</th>
<th>p value</th>
<th>Consensus statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a) I believe that LRM is effective in the reduction of post-stroke upper limb oedema despite a lack of scientific evidence</td>
<td>30</td>
<td>0</td>
<td>n/a</td>
<td></td>
<td>Agreement</td>
</tr>
<tr>
<td>1b) I will continue to use / would use light retrograde massage until there is evidence to say that it is not effective.</td>
<td>31</td>
<td>0</td>
<td>n/a</td>
<td></td>
<td>Agreement</td>
</tr>
</tbody>
</table>

A= agree; D= disagree; n= number
## Results

<table>
<thead>
<tr>
<th>Question 2</th>
<th>A n</th>
<th>D n</th>
<th>Chi²</th>
<th>p value</th>
<th>Consensus status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a  It is necessary to use mild, moderate and severe as classifications of oedema when using visual inspection in the clinical setting</td>
<td>18</td>
<td>1</td>
<td>15.21</td>
<td>p&lt;0.001</td>
<td>Agreement</td>
</tr>
<tr>
<td>b  Circumferential measurement is a necessary addition to the assessment of post stroke upper limb oedema in the clinical setting</td>
<td>17</td>
<td>3</td>
<td>9.80</td>
<td>p=0.002</td>
<td>Agreement</td>
</tr>
<tr>
<td>c  Volumetric assessment is a necessary addition to the assessment of post-stroke upper limb oedema in the clinical setting</td>
<td>7</td>
<td>11</td>
<td>0.52</td>
<td>p=0.467</td>
<td>No consensus</td>
</tr>
</tbody>
</table>

A= agree; D= disagree; n= number
Criteria for the use of LRM – consensus agreement

- Visible signs of oedema
- Swelling affects movement / positioning
- Swelling affects functional use of the hand
- Reduced sensation and proprioception present
- Pain and discomfort present
- Patient is cognitively able to comply with treatment
Contraindications for the use of LRM consensus agreement

- Skin problems, integrity / condition / broken / infection / fragile
- Soft tissue trauma – open wounds
- Cannula / venflon in hand

NB: Consensus disagreement that `reduced sensation` is a contraindication
Treatment programme

- Positioning programme
- Supported elevation of the upper limb
- Education & advice to staff, patient family & carers
- Encourage functional use / active movement of the hand & arm
- Passive range of movement
- Arm/wheelchair supports
- Hand hygiene – hand care
- Full arm compression – (tubigrip)
- Stretch programme
Consensus agreement
‘Best practice’ - LRM

- Administered on a daily basis
- For 10-15 minutes
- Assistants, family & carers can be taught to administer LRM with appropriate supervision from a therapist
- Patients / clients can be taught to self administer LRM with appropriate supervision from a therapist
Consensus.....

Measurement of the effectiveness of LRM

- Visible inspection
- Circumferential measurement
- Movement / functional use has improved
- Patient / family report improvement

Additional comments-consensus

- LRM has a psychological benefit for the family member / carer administering it as it offers them a sense of helping the patient
- LRM enhances patient / therapist (or assistant) rapport
Reference


Acknowledgements

- Members of COTSSSNP
- Administrators for COTSSSNP
- **Funding of MSc in Health Services Research**
- Elizabeth Casson Memorial Trust
- NHS Grampian – Stroke MCN