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for every patient

Case study: abdominal electrical stimulation for constipation in PD

Emily Padfield, Paul Taylor, Ian Swain, Christine singleton, Tamsyn Street
• Parkinson’s Disease (PD) is a chronic neurodegenerative multi-system condition.
• Estimates of 27-67% of all people with PD have constipation.
• Primary reason: deterioration of neurological pathways that promote the peristaltic reflex. This reduces colonic transit time.
• Secondary factors: reduced mobility, poor diet and fluid intake and medication.
• Many patients are unresponsive to laxatives which predisposes them to developing other issues such as bowel obstruction, megacolon, bowel perforation and surgical emergencies.
• Although other neurological conditions have been explored such as SCI, MS and paediatric populations. There has been no investigation into the use of the technique for PD.
CASE PRESENTATION

• A 75 year old female patient diagnosed 5 years ago.
• Previous use of lower limb FES due to being involved in a research trial.
• Satisfied ROME III criteria for functional constipation.
• Reported constipation experienced since teenage years
• On average bowels opened x2 a week, with straining and a hard stool consistency.
• Commonly experienced period of bowels not opening for more than 3 days – use of lactulose.

• Lactulose leads to an uncomfortable bowel opening – painful and unpleasant.

• Senna and laxido ineffective.

• High fibre diet and walking half a mile each day using a stick. Independent in ADL.
Main concerns were regarding regularity and comfort with regards to bowel movements.
METHOD

• Electrical stimulation was delivered using a microstim 2 device (OML). Adhesive rectangular electrodes 9cm X4cm were placed over the external oblique and transverse abdominis muscles. (parameters 40Hz, 33µ pulse width and 40-50 mA.

• After training at initial assessment, the patient independently treated themselves at home. Initially for 15 minutes twice daily in the morning and evening for the first two days. Increased to 30 mins twice daily.
Figure 1: Electrode positioning
2 weeks baseline and completion of questionnaires

Set up of device and training

6 weeks of self administered treatment x2 a day @30 minutes

Follow up questionnaires

4 week wash-out period without stimulation followed by questionnaires

Bowel Diary throughout study

Patient-Centred & Safe
Professional
Responsive
Friendly
OUTCOME MEASURES

• Bowel Diary (frequency, consistency, medication)
• Patient assessment of constipation related quality of life
• PD specific quality of life
• Health related quality of life EQ 5D5L
RESULTS

• PAC QoL: Satisfaction score improved - 4/10 to 8/10
• Decrease in dissatisfaction score 35/96 to 31/96
• Decrease in time of bowel movement – 10 minutes to 6.15 minutes
• Frequency of bowel movement increased to nearly every morning 1-2 hours post stimulation.
• No changes in EQ5D5L or PD specific quality of life
• Reduction in the use of laxatives
• Increased awareness of urge to defecate (reported main benefit).
• No adverse events reported.
• Usability of device good.
Discussion

• The outcome measures suggest the patient experienced some effectiveness from the use of electrical stimulation.
• Further research would include a longer treatment period and the opportunity to use titration after the initial 6 weeks.
• Additionally a longer baseline period would be advantageous.
RESULTS OTHER DIAGNOSIS

- MS
- PD
- Stroke
- SCI

- Still awaiting phase out data
• **Improved satisfaction score at 6 weeks (Mdn 12/16 from 1/16 )**
• **Reduction in dissatisfaction score ( 33/96  from 64/96)**

- **MSIS-29 score 95-> 85**
Results: MS

• All patients reported a benefit with utilising the stimulator

<table>
<thead>
<tr>
<th>Bowel diary item</th>
<th>Patient 1</th>
<th>Patient 2</th>
<th>Patient 3</th>
<th>Patient 4</th>
<th>Patient 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straining to open bowels</td>
<td>0</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Passing hard stools</td>
<td>+1</td>
<td>0</td>
<td>0</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Incomplete bowel evacuation</td>
<td>+1</td>
<td>0</td>
<td>+1</td>
<td>0</td>
<td>+1</td>
</tr>
<tr>
<td>Frequency of bowel evacuation</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
</tr>
<tr>
<td>Laxative use decreased</td>
<td>+1</td>
<td>0</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
</tr>
<tr>
<td>Reduction in time for Bowel Opening</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
</tr>
</tbody>
</table>

Key: 0 no change from baseline, +1 improvement from baseline
• Still awaiting phase out data

• All received a benefit

• All had an improvement in constipation specific QOL questionnaire
Results: PD

- Increase in satisfaction score (4/16 to 8/16)
- Decrease in dissatisfaction score (35/96 to 31/96) (figure 3)

![Graph depicting change in PACQOL scores](image)

Figure 3: Graph depicting change in PACQOL scores
• Reported benefit
  • Easier, quicker, more comfortable

Table 2: Change in bowel diary items at 6 weeks compared to baseline

<table>
<thead>
<tr>
<th>Bowel diary item</th>
<th>Patient 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straining to open bowels</td>
<td>+1</td>
</tr>
<tr>
<td>Passing hard stools</td>
<td>0</td>
</tr>
<tr>
<td>Incomplete bowel evacuation</td>
<td>+1</td>
</tr>
<tr>
<td>Frequency of bowel motions</td>
<td>0</td>
</tr>
<tr>
<td><strong>Laxative use decreased</strong></td>
<td>0</td>
</tr>
<tr>
<td>Reduction in time for Bowel opening</td>
<td>+1</td>
</tr>
</tbody>
</table>

Key: 0 no change from baseline, +1 improvement change from baseline
Results: Stroke

- Increase in satisfaction score (5/16 to 9/16)
- Reduction in dissatisfaction score (44/96 to 32/96)

Figure 4: Graph depicting change in PACQOL scores
Reported benefit

- Overall positive, came off laxatives completely

Table 3: Change in bowel diary items at 6 weeks compared to baseline

<table>
<thead>
<tr>
<th>Bowel diary item</th>
<th>Patient 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straining to open bowels</td>
<td>+1</td>
</tr>
<tr>
<td>Passing hard stools</td>
<td>0</td>
</tr>
<tr>
<td>Incomplete bowel evacuation</td>
<td>+1</td>
</tr>
<tr>
<td>Frequency of bowel motions</td>
<td>+1</td>
</tr>
<tr>
<td>Laxative use decreased</td>
<td>+1</td>
</tr>
<tr>
<td>Reduction in time for Bowel Opening</td>
<td>0</td>
</tr>
</tbody>
</table>

Key: 0 no change from baseline, +1 improvement from baseline
• Increase in satisfaction score (6/16 to 9/16) (figure 5)
• Reduction in dissatisfaction score (71/96 to 38/96) (figure 5)

Figure 5: Graph depicting change in PACQOL scores
Table 3: Change in bowel diary items at 6 weeks compared to baseline

<table>
<thead>
<tr>
<th>Bowel diary item</th>
<th>Patient 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straining to open bowels</td>
<td>1</td>
</tr>
<tr>
<td>Passing hard stools</td>
<td>1</td>
</tr>
<tr>
<td>Incomplete bowel evacuation</td>
<td>1</td>
</tr>
<tr>
<td><strong>Frequency of bowel motions</strong></td>
<td>0</td>
</tr>
<tr>
<td>Laxative use decreased</td>
<td>0</td>
</tr>
<tr>
<td>Reduction in time for Bowel Opening</td>
<td>0</td>
</tr>
</tbody>
</table>

Key: 0 no change from baseline, +1 improvement from baseline
Results

• All patients received benefit
• Safe

• Comfort improved
• Improved sensation

• Await post intervention phase out results
Limitations/recommendations

• Limited sample size
• Baseline period too short?
• Treatment period too short?
• Mobility
• Diet
• Constipation is common in patients with neurological conditions
• Many do not achieve adequate control with standard treatment
• Abdominal ES was effective in MS cases
• Abdominal ES may be effective in PD, SCI and stroke
• Need further trials before conclusions can be drawn
• Abdominal ES is a safe, non-invasive and promising therapy
Questions?

Salisbury NHS Foundation Trust

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Table 1: MS Participants characteristics

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Age</th>
<th>Time since diagnosis (years)</th>
<th>Length of FES use (years)</th>
<th>EDSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>43</td>
<td>13.3</td>
<td>2.7</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>60</td>
<td>15.7</td>
<td>0.25</td>
<td>5.5</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>50</td>
<td>4</td>
<td>2.25</td>
<td>6.5</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>53</td>
<td>16.5</td>
<td>1</td>
<td>5.5</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>58</td>
<td>15.5</td>
<td>8.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>