Physiotherapy Management for Faecal Incontinence in Children

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Introduction

• Definition:
  ➤ Recurrent uncontrolled passage of gas, liquid, or solid stool
  ➤ Can be passive incontinence, urge incontinence or faecal seepage

Introduction

Prevalence

• Local: - About 30% children have constipation, 6% to 10% has incontinence of varying degree
  - Around 200 new cases per year in 2 local hospitals (QEH & UCH)

• Overseas: - 1.5% of the general population, ~ 3 million Americans were affected
Introduction

• Factors associated with faecal incontinence:
  - Constipation
  - Toileting habit
  - Family problems
  - Psychiatric problems (e.g. Schizophrenia)
  - Mental retardation (e.g. Down’s syndrome)
  - Neurological disease (e.g. Spina Bifida)
  - Anatomical deviations (e.g. Anorectal Malformation)

Pena A & Hong A (2000)
Bulk-Bunscoten AMW et al (2007)
Anorectal Malformation (ARM)

- Prevalence
  - Affecting 1 in 4000 – 5000 newborns
- Classification
  - Often confused
  - High, intermediate, low anomalies
- Management
  - Surgery (30% - 56% patients have significant faecal soiling after surgery)
  - Physiotherapy

Normal Bowel Function

• Bowel control depends on:
  – Functional pelvic floor muscles
  – Functional internal & external anal sphincters
  – Intact pudendal nerve
  – Intact rectal sensation
  – Adequate rectal accommodation
  – Cognition

Sushmita Bhatnagar (2007)
Function of Pelvic Floor Muscles (PFM)

- Support the abdominal & pelvic contents
- Control bowel & bladder function
- Counteract changes in abdominal pressure
  → Maintain continence

Enck P & Vodusek DB (2006)
Anatomy of Pelvic Floor Muscle (PFM)

Superficial Layer: Figure of 8; sphincters

Deep Layer: Levator Ani & Coccygeus
Anatomy of PFM

• **Internal Anal Sphincter**
  - Smooth muscle
  - Autonomous nervous system
  ➤ Tonically contracted (80% of the resting anal pressure)

• **External Anal Sphincter**
  - Striated muscle
  - Pudendal nerves (S2-4)
  ➤ Partially contracted at rest (20% of the resting anal pressure)
Overview of Physiotherapy Management

- Biofeedback
  - Electromyography (EMG)
  - Peri-anal or Intra-anal
- Electrical Stimulation (ES)
- Pelvic Floor Muscles Training (PFMT)

Biofeedback

- Originated in the late 1960s
- Use monitoring instruments to feed back to patients with physiological information which they are normally unaware of
- Visual / auditory display
- Facilitation / inhibition
- Labor-intensive, safe, effective, inexpensive, long term effect

Electromyogram (EMG)

- H. Piper – the first investigator (1912)
- Needle & surface EMG
- Intra-anal & peri-anal
- Record muscle action potentials with skin surface electrodes

Electrical Stimulation (ES)

- Low frequency current ~ 20 – 50 Hz
- Nerve or muscle stimulation
- Strength & endurance
- Parameters: frequency, pulse width, hold time & rest time, current intensity & duration
- Synchronized with biofeedback to maximize effect on voluntary motor control

Pelvic Floor Muscles Training

- Essential to prevent or treat incontinence
- Improve strength and endurance
- Comprehensive assessment
- Initial stage: ES and PFM exercises
- Progression: in conjunction with biofeedback
- Wean off ES & EMG biofeedback, continue with pelvic floor muscles training

Johnson VJ (2001)
Local Experience –
Physiotherapy Management for Faecal Incontinence for Children with Anorectal Malformation in QEH

• Collaborated with Department of Surgery, QEH since 2001
• Structured physiotherapy program by a team of paediatric physiotherapists
• 6 months department-based program, followed by 6 months home-based program with monthly FU
Aims of Physiotherapy Management for Faecal Incontinence

- Improve strength & endurance of pelvic floor muscles
- Educate coordination of pelvic floor muscles
- Improve control of sphincters
- Train faecal-continence function
- Improve awareness
- Bowel habit re-education
- Life-style modification, coping strategies and skin care
- Psychological and emotional support
- Improve social life and quality of life
Objectives of Program

• To improve patients’ functional outcomes and empower patients’ home management.

• To evaluate the effectiveness of physiotherapy intervention in faecal incontinence.
Target Clients

• **Inclusion criteria:**
  – Children presented with faecal incontinence after surgery for ARM
  – Age: 5 years or above
  – Good mental status

• **Exclusion criteria:**
  – Children with learning difficulty
Framework of Treatment Program

**Phase 1**
- Department-based
- Intensive regular treatment sessions + home exercise

**Phase 2**
- Weaning
  - ↓ frequency of treatment sessions, more emphasis on home program

**Phase 3**
- Home-based
  - with regular home exercise and Re-assessment monthly

Assessment at Initial, 6th month and 12th month
1) EMG biofeedback
2) Rintala continence score
3) Soiling rank
Treatment Program

Treatment program outline:

- Biofeedback training
- Electrical stimulation for muscles re-education and strengthening
- Pelvic floor muscles training
- Home exercise
EMG Biofeedback

• Position: crook lying
• Surface electrodes over perineum, ground electrode over sacrum
EMG Biofeedback

- Facilitating audio sound
- Visual feedback
- Hold for 5 sec
- Rest for 5 sec
- 99 repetitions
EMG Biofeedback

Relax → Maximal Contraction
Electrical Stimulation (ES)

- Electrodes are placed around the perineal area similar to that with biofeedback
- Intensity: as tolerated, usually 18 – 20mA
- Hold for 5 seconds
- Rest for 5 seconds
- Duration: 20 to 30 minutes
- EMG trigger + ES

(Low & Reed 2000)
Pelvic Floor Muscles Training

• Active muscle contraction
• Use of ball to facilitate training: enhance sensation of perineal muscle contraction
• Long-term home-based training: maintain strength & prevent atrophy
• Carry over in daily living at all times
Home exercise log book:
- Record no. of times of bowel open
- No. of episodes of incontinence
- Duration and frequency of exercise
- Use of enema
Outcome Measures

- EMG biofeedback – strength of the PFM
- Rintala questionnaire score – bowel function
- Soiling rank
EMG Record

- Measure the mean voltage during active contraction / relaxation
- Work average in micro-volts
- Rest average in micro-volts
Rintala score:
- Ability to hold
- Urge to defecate
- Frequency of defecation
- Frequency of soiling
- Frequency of accidents
- Degree of constipation
- Social problems

Max = 20 marks
Soiling Rank

Ranks from 1 to 5:
1. More than 7 times per week
2. 4 – 7 times per week
3. 2 – 3 times per week
4. Less than twice per week
5. Nil soiling
Data Analysis

• Statistical method:
  ➢ Paired t-test for EMG study
  ➢ Wilcoxon signed ranks test for Rintala questionnaire score study and soiling rank
  ➢ All analyses were done using SPSS version 17.0
Results

March 2001-2009
45 subjects recruited

39 subjects
age ranging from 5 to 19

6 subjects withdrawn with reasons:
Mental retardation and autistic features,
medical, financial problems
or lack of parents support

29 subjects completed the 1-year programme
10 subjects continue the programme

Subjects for statistical analyses:
19 boys and 10 girls

Status of the subjects
- Completed: 29 (64%)
- Active Patient: 10 (22%)
- Withdrawn: 6 (13%)

Gender of the subjects completed
- Girls: 10 (34%)
- Boys: 19 (66%)
Improvement in Pelvic Floor Muscle Strength as Reflected by EMG Study

Using Paired-t Tests (2 Tailed):

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<th>6th month vs initial</th>
<th>12th month vs initial</th>
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<tbody>
<tr>
<td>% improvement</td>
<td>+88.9%</td>
<td>+124.3%</td>
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<td>Significance</td>
<td>&lt;0.001</td>
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Improvement in Overall Bowel Function as Reflected by Rintala Score Study

Means of Q Score

Using Wilcoxon Signed Rank Tests (2 Tailed):

<table>
<thead>
<tr>
<th></th>
<th>6th month vs initial</th>
<th>12th month vs initial</th>
</tr>
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<tbody>
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<td>+23.1%</td>
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<tr>
<td>Significance</td>
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</table>
Decreased in Soiling Frequency as Reflected by Soiling Rank Study

Means of Soiling Rank

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<th>12th month vs initial</th>
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<tr>
<td>% improvement</td>
<td>+37.9%</td>
<td>+47.1%</td>
</tr>
<tr>
<td>Significance</td>
<td>&lt;0.001</td>
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</table>
Discussion

Long term effect:

• Improvement was maintained with home-based program as reflected by data at 1-year FU.
Discussion

Problems encountered:

• Lengthy (1 year program)
• Time-consuming (~ 1 hour per session)
• Active children with low concentration
• Fluctuated hygiene consciousness
Discussion

• Six children were withdrawn
  – mental retardation and autistic features
  – defaulted since inadequate family support
  – other medical problem; financial problem
Discussion

Key for success:
• Age $\geq$ 5 years old
• Good mental/cognitive function
• Good compliance to treatment regime, drugs, diet
• Good medical & family support
Conclusion

- Faecal incontinence:
  - multi-factorial
  - multi-disciplinary approach
- Devoted team
Conclusion

• As a pioneer hospital to launch this service, we found all positive findings including:
  – physical parameters
  – psychosocial aspect
    • Clean pants
    • Able to go swimming
    • Less embarrassment
    • Enjoy normal life & growth
Acknowledgement

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Thank You
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