Fecal Incontinence

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Definition

• Uncontrolled passage of solid or liquid stool in subject with mental age ≥4 years
• It is controversial whether incontinence for flatus should be included. Convention is to define:
  ➢ Anal incontinence (AI) includes accidental loss of gas; however, 11% of men and women report accidental loss of flatus on a daily basis
  ➢ FI is limited to loss of solid, liquid, or mucus
• Staining or “streaking” of underwear, sometimes called soiling, is common and is not addressed by survey definitions of FI
Prevalence of FI is strongly associated with age and weakly associated with sex.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>8.9%</td>
<td>7.7%</td>
</tr>
<tr>
<td>30-39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55-69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;70</td>
<td></td>
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</tbody>
</table>

Prevalence in nursing homes is 48%.

FI occurs at least weekly in 2.7% and at least daily in 0.8%.
Most accidents consist of liquid stool

<table>
<thead>
<tr>
<th></th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucus</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Liquid</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Solid</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Quality of Life Impact

- Embarrassment
  - Self-imposed social isolation
  - Stigmatization
- Anxiety and depression
- Burden on family care-givers
- Contributes to nursing home referral
FI is Under-reported

Multivariate Analysis of Risk Factors
Whitehead et al. Gastroenterol 2009;137:512-7

<table>
<thead>
<tr>
<th>Variable</th>
<th>Women: OR (95% CI)</th>
<th>Men: OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (10 year interval)</td>
<td>1.2 (1.1, 1.3)</td>
<td>1.2 (1.1, 1.4)</td>
</tr>
<tr>
<td>Watery or mushy stools</td>
<td>2.8 (1.9, 4.1)</td>
<td>4.8 (1.9, 11.9)</td>
</tr>
<tr>
<td>&gt;21 Stools per week</td>
<td>2.3 (1.1, 4.9)</td>
<td></td>
</tr>
<tr>
<td>Unable to do physical activity</td>
<td>2.2 (1.1, 4.5)</td>
<td></td>
</tr>
<tr>
<td>1 Chronic illness (vs. none)</td>
<td>1.9 (1.3, 2.9)</td>
<td></td>
</tr>
<tr>
<td>&gt;2 Chronic illness (vs. none)</td>
<td>2.2 (1.2, 4.1)</td>
<td></td>
</tr>
<tr>
<td>Poor self-rated health</td>
<td></td>
<td>1.8 (1.2, 2.7)</td>
</tr>
<tr>
<td>Urinary incontinence</td>
<td>1.6 (1.0, 2.7)</td>
<td>2.6 (1.5, 4.6)</td>
</tr>
</tbody>
</table>
GI symptoms and disorders as risk factors for FI

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Prevalence of Risk Factor</th>
<th>OR for FI or Percent with FI</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhea</td>
<td>6% - 7%</td>
<td>OR 2.4-4.9</td>
<td>OR 2.3 in NH</td>
</tr>
<tr>
<td>Constipation:</td>
<td>3% - 9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow transit</td>
<td></td>
<td>No association</td>
<td></td>
</tr>
<tr>
<td>Dyssyn Defec</td>
<td></td>
<td>Probable risk</td>
<td>Limited data</td>
</tr>
<tr>
<td>Urgency</td>
<td>14% (women)</td>
<td>OR 5.6-8.3</td>
<td>Limited data</td>
</tr>
<tr>
<td>IBS</td>
<td>10% - 15%</td>
<td>OR 2-8</td>
<td>Limited data</td>
</tr>
<tr>
<td>IBD</td>
<td>&lt;0.01%</td>
<td>~25% (pre-op)</td>
<td></td>
</tr>
<tr>
<td>Hemorrhoids</td>
<td>4% - 20%</td>
<td>48% - 63%</td>
<td>Mainly soiling</td>
</tr>
<tr>
<td>Rectal prolapse</td>
<td>0.4%</td>
<td>OR ~2</td>
<td>Mainly soiling</td>
</tr>
<tr>
<td>Descent of perineum</td>
<td>?</td>
<td>15% - 60%</td>
<td>Limited data</td>
</tr>
</tbody>
</table>
Most common etiologies for FI

<table>
<thead>
<tr>
<th>Category</th>
<th>Mechanism</th>
<th>Common Etiologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional</td>
<td>Fecal impaction: dilated internal anal sphincter</td>
<td>Pelvic floor dyssynergia (difficulty relaxing sphincter when defecating)</td>
</tr>
<tr>
<td></td>
<td>Diarrhea: rapid transit, large vol</td>
<td>IBS, Infectious &amp; metabolic diarrhea</td>
</tr>
<tr>
<td></td>
<td>Cognitive/psychological</td>
<td>Dementia, psychosis, willful soiling</td>
</tr>
<tr>
<td>Sphincter weakness</td>
<td>Sphincter muscle injury</td>
<td>Obstetrical trauma, MVA, foreign body trauma</td>
</tr>
<tr>
<td></td>
<td>Pudendal nerve injury</td>
<td>Obstetric injury, diabetes, MS</td>
</tr>
<tr>
<td></td>
<td>CNS injury</td>
<td>Spina bifida, traumatic cord injury, CVA, MS</td>
</tr>
<tr>
<td>Sensory loss</td>
<td>Afferent nerve injury: unable to detect rectal filling</td>
<td>Diabetic neuropathy, spinal cord injury, MS</td>
</tr>
<tr>
<td>Reduced reservoir</td>
<td>Non-compliant rectum</td>
<td>Ulcerative proctitis, radiation injury, rectal resection</td>
</tr>
</tbody>
</table>

Diagnostic evaluation

- **History**
  - Characterize type of FI
  - identify diarrhea & constipation as contributing factors
  - Assess medical, surgical, and obstetric history
- **Physical exam**
- Anorectal manometry and pelvic floor EMG
- Endosonography or MRI of anal sphincters
- Other tests as indicated (defecography, balloon evacuation test)
Resting and squeeze pressures in anal canal measured by stationary pull-through

High Resolution Anorectal Manometry
Anorectal Manometry also measures

- Sensory thresholds
  - First sensation
  - Urge to defecate
  - Maximum tolerated volume
- Compliance of rectum
- (Rectoanal inhibitory reflex)
- (Response to straining)

Anal Ultrasound
In 37 year old
With incontinence
2nd obstetrical injury
Conservative Management

• Education
  ▪ Teach mechanisms of continence using anatomy drawings
  ▪ Discuss importance of stabilizing stool consistency
  ▪ Discuss triggers: foods, stress, lifting, coughing

• Toileting schedule
• OTC medications to normalize stool consistency
• Pelvic floor exercises

Effects of conservative management
Heymen et al. Disi Colon Rectum 2009;52:1730-7

• 20% of patients reported adequate relief after 4 weeks
• 60% decrease in average frequency of FI
• Benefits well maintained:
  ➢ 83% still reported adequate relief at 3 mo FU
  ➢ 71% at 12 months
Drugs for diarrhea-related FI

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loperamide</td>
<td>2-4 mg average (titrate)</td>
<td>No CNS action; may cause constipation</td>
</tr>
<tr>
<td>Diphenoxylate + Atropine</td>
<td>2 X 2.5 mg tabs</td>
<td>Less effective than loperamide, more side-effects than loperamide</td>
</tr>
<tr>
<td>Amitriptyline</td>
<td>20 mg</td>
<td>Decreases urgency &amp; frequency</td>
</tr>
<tr>
<td>Psyllium &amp; gum agar</td>
<td>Up to 15 g/day</td>
<td>Milder cases, elderly</td>
</tr>
</tbody>
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Double-blind cross-over study comparing loperamide, codeine, & diphenoxylate

*Loperamide significantly better than diphenoxylate*
Biofeedback compared to PF exercise

Biofeedback Treatment Protocol

- Six one-hour sessions for Biofeedback or pelvic floor exercises
- Both described to patients as “effective behavioral treatments”
- 1 on 1 with therapist every 2 weeks
- Pelvic floor exercises performed by both groups
- Education, medications, and behavioral strategies continued from run-in
Percent Reporting Adequate Relief (Intent to Treat analysis)

P = .001

Outcomes of Biofeedback

Adequate Relief % in Patients who Completed Training

% Completely Continent at 3 Months FU
Biofeedback Summary

- Heymen study suggests significant benefit of biofeedback compared to PFE alone
- Other RCTs have not found a significant difference
- Outcomes are strongly influenced by skill and experience of the biofeedback therapist

Triple-Target Treatment (3T)
Schwander et al. Dis Colon Rectum 2010;53:1007-16

- Patients train for 20 min twice daily at home
- Morning session alternates electrical stimulation at 1000 Hz with relaxation, contraction, and relaxation
- Evening session: Patient voluntarily squeezes and EMG response above a threshold triggers 1000 Hz ES which triggers a larger contraction
- All training is done at home for 6-9 month duration
Triple Target Treatment vs. EMG Biofeedback
Schwandner et al. Dis Colon Rectum 2010;53:1007-16

Cleveland Clinic Incontinence Scores

<table>
<thead>
<tr>
<th></th>
<th>EMG Biofeedback</th>
<th>3T Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>3 Months</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>6 Months</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>9 Months</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
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P=.0024

Tibial Nerve ES

• Stainless steel needle inserted between margin of tibia and soleus muscle about 3 finger breadths above medial malleolus; reference on sole of foot
• Increase ES current until toes are splayed and tingling sensation occurs. Use maximum tolerable current.
• Alternative technique is to apply adhesive electrodes to skin over tibial nerve. Surface electrodes were not found to be effective.
Comparison of cutaneous, trans-cutaneous, and sham tibial nerve stimulation


Responder = 50% reduction in FI

82% 46% 13%

P = .035

Needle Surface Sham

Sacral Nerve Stimulation

• Barbed electrodes are inserted into sacral nerve with needle
• Electrode location is selected at which ES causes sphincter contraction
• Trial stimulation: the electrodes are connected to an external stimulator for 2-week period
• If there is a 50% decrease in frequency of FI, a permanent stimulator is implanted beneath skin
Summary for Tjandra Study

- For ITT analysis, **58% of enrolled patients had at least 75% improvement** and **42% were continent**.
- FIQOL improved significantly more with SNS.
- Anal manometry showed no improvement in resting or squeeze pressure. **Mechanism is unclear**.
- Results strongly support the efficacy of SNS.
- Adverse events included pain at incision in 6 but no infections requiring explant.
RCT: Efficacy of Dextranomer Injections

- Compared 1-2 injections (4-8 ml) of dextranomer to sham injection
- No selection for passive FI
- At 6 months, 52% of active vs. 31% of sham had >50 reduction in FI
- FIQoL improved more in active group
- At 12 months, 69% still had >25% reduction
- AEs were pain (14%), bleeding (7%)
- 2/136 had SAE of abscess

Summary: Prevalence & Risk Factors

- FI is very common
  - 9% of women and 8% of men
  - Weekly in 2.7%, daily in 1%
  - Less than 30% report the symptom to their MD
  - Physicians rarely screen for FI
- Strongest risk factors:
  - Age
  - Diarrhea and urgency
  - Comorbid medical disorders
  - GI and neurological disorders
Diagnosis

- History and digital rectal exam
- Test for:
  - Anal canal squeeze pressure
  - Anal canal resting pressure
  - Sensation
  - Compliance (reservoir capacity)
- Standard tests are
  - Anorectal pressure measurements
  - Ultrasound of anal canal

Treatment

- 1st line treatment is education & meds to normalize stool consistency; expect about 60% improvement but low cure rate
- Biofeedback – effective but operator dependent
- Electrical stimulation
  - Low frequency ES in anal canal is not effective
  - Triple-target therapy combining electrical stimulation with EMG biofeedback is well supported
  - Tibial nerve stimulation is promising
  - Sacral nerve stimulation is strongly supported
- Dextranomer injections supported by one RCT