Stuhl-Inkontinenz Update 2016
Neues in der Abklärung und der konservativen Therapie

H. Frühauf

37. Schweizerische Koloproktologie-Tagung
Bern, 16. Januar 2016, 09.05-09.35

Abteilung für Gastroenterologie
Universität Zürich
Epidemiology, Pathophysiology, and Classification of Fecal Incontinence: State of the Science Summary for the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Workshop

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Am J Gastroenterol 2015; 110:127-36
# Fecal Incontinence – Epidemiology

- **2nd most important cause for admission of elderly to nursing homes** [1]

<table>
<thead>
<tr>
<th>Prevalence: General population</th>
<th>2.2 - 18.4%</th>
<th>[2-4]</th>
</tr>
</thead>
<tbody>
<tr>
<td>nursing home setting</td>
<td>~ 50%</td>
<td>[5]</td>
</tr>
</tbody>
</table>

- **Only ~ 1/3 ever discussed the problem with a physician** [3]

- **~ 400 Mio. USD / year for pads / diapers** [3]

- **~ 1,5-7 Mrd. USD / year for nursing home care** [6]

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5. Nelson, Gastroenterology 2004; 126:S3-7
Estimated prevalence of FI in noninstitutionalized US adults:


<table>
<thead>
<tr>
<th>Age Group</th>
<th>Fecal Incontinence Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>0.0%</td>
</tr>
<tr>
<td>30-39</td>
<td>2.6%</td>
</tr>
<tr>
<td>40-49</td>
<td>7.7%</td>
</tr>
<tr>
<td>50-59</td>
<td>15.3%</td>
</tr>
<tr>
<td>60-69</td>
<td>20.0%</td>
</tr>
<tr>
<td>70+</td>
<td>24.0%</td>
</tr>
</tbody>
</table>

Online survey

Definition and Reporting Bias

Preferred term: "accidental bowel leakage" > FI


("erectile dysfunction" > impotence)

Whitehead WE, Gastroenterology 2009; 137:512-7
Fecal incontinence and stool consistency


Estimated prevalence of FI in noninstitutionalized US adults
FI: accidental leakage of liquid, solid, or mucus ≥ 1 / last month

Whitehead WE, Gastroenterology 2009; 137:512-7
# Predisposing factors for fecal incontinence

**Bharucha AE et al., Am J Gastroenterol 2015; 110:127-36**

<table>
<thead>
<tr>
<th>Non-modifiable risk factors</th>
<th>Modifiable risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Age</td>
<td>- Rectocele OR 4.9</td>
</tr>
<tr>
<td>- Female sex</td>
<td>- Current smokers OR 4.7</td>
</tr>
<tr>
<td>- Diarrhea</td>
<td>- Obesity OR 4.7</td>
</tr>
<tr>
<td>(weak or loose + freq. &gt;2/week)</td>
<td>- Inappropriate cholecystectomy OR 4.2</td>
</tr>
<tr>
<td>- rectal urgency</td>
<td>- anal sphincter trauma</td>
</tr>
<tr>
<td>- burden of chronic illness</td>
<td>- Physical inactivity</td>
</tr>
<tr>
<td>- Urinary (urge) incontinence</td>
<td></td>
</tr>
</tbody>
</table>

**OR** = Odds Ratio
Anatomy and Physiology

- Colonic mass movements
- Rectal stool distension
- RAIR: Rectoanal inhibitory reflex
- Anorectal perception
- Sphincter contraction
- Sphincter relaxation
Determinants of continence

- Structural: Reservoir volume, Rectocele
- Sphincter Pressure, Squeeze duration
- Function: Anorectal Perception
- Stool: Consistency
Anorectal function tests

- EMG / PNTML
- Continence test
- Defaecography
- Rectalkapazität
- Rektale Compliance
- Rektale Sensibilität
- Levator ani
- M. sphincter ani internus
- M. sphincter ani externus
- Rectal Barostat / Perception test
- Anorectal manometry

Fox MR,…Frühauf H et al. Digestion 2011; 83:46-53
Determinants of continence

Structural:
Reservoir volume

Function:
Anorectal Perception
Rectal Barostat

Pressure - volume relation

Diagram of rectal barostat equipment and a graph showing the pressure-volume relation.
**Rectal perception and compliance vary with rectal capacity**

Volume measurements are reproducible *within patients* and can be compared *between patients* after normalisation to rectal capacity.
Barostat: compliance and sensitivity

- **hypo**compliant (‘rigid’): urgency → urge incontinence
  
  *Chan, Scott, Williams, Lunniss. Dis Colon Rectum 2005*

- **hyper**compliant (‘too loose’): Rectal evacuation disorder
  
  +/- passive fecal incontinence

  *Gladman, Dworkin, Williams, Lunniss, Scott. Am J Gastroenterol 2005*
Perception testing with „Rapid Barostat“

**Perception thresholds**
- Initial perception
- Urgency
- Max. tolerated volume

**Rectal capacity**
\[ = \text{Vol} @ 40 \text{ mmHg} \]

„Compliance“
- Pressure @ 50% rectal capacity
Perception testing with „Rapid Barostat“

**Perception thresholds**
- Initial perception (10-30% RC)
- Urgency (40-80% RC)
- Max. tolerated volume (>80 % RC)

**Rectal capacity (RC)**

\[ \text{RC} = \text{Vol} @ 40 \text{ mmHg} \]

(200-450 ml)

**„Compliance“**
- Pressure @ 50% rectal capacity

Sauter M, …, Fruehauf H Neurogastroenterol Motil 2014; 26:685-95
Determinants of continence

- Sphincter
- Pressure
- Squeeze
- Duration
High-resolution anorectal manometry

2 intrarectal pressure sensors

10 pressure sensors in anal canal

"solid state catheter"

Manoscan AR 360, Sierra Scientific Instruments, Los Angeles, U.S.A.
High-resolution anorectal manometry

→ color coded 2D plot

Interpolation

Clouse et al. AJP 1996

Manoscan AR 360,
Sierra Sientific Instruments,
Los Angeles, U.S.A.
Decreased resting pressure and inappropriate and shortened squeeze pressure (rise) in an elderly female patient. Additionally, decreased rectal capacity and anorectal hypersensitivity (not shown).
Coaching: Instruction and Feedback
Coaching during anorectal manometry changed the diagnosis based on manometry from "pathologic" to "normal" values in 14/31 (45%) patients with incontinence.
High-resolution anorectal manometry

How to Perform and Interpret a High-resolution Anorectal Manometry Test

Tae Hee Lee1 and Adil E Bharucha2*

1Institute for Digestive Research, Soochunhyang University Seoul Hospital, Seoul, Korea; and 2Clinical Enteric Neuroscience Translational and Epidemiological Research, Mayo Clinic and Mayo Foundation, Rochester, Minnesota, USA

- Less movement artifacts

Jones P, Am J Gastronenterol 2007
Sauter M, Neurogastroenterol Motil 2014
**HR-ARM: Normal values in women**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Noelting et al²²</th>
<th>Noelting et al²²</th>
<th>Li et al²³</th>
<th>Lee et al²⁴</th>
<th>Carrington et al⁷</th>
<th>Cross-Adame et al²⁷</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>F (n = 30, &lt; 50 years)</td>
<td>F (n = 32, ≥ 50 years)</td>
<td>F (n = 46)</td>
<td>F (n = 27)</td>
<td>F (n = 96)</td>
<td>F (n = 42)</td>
</tr>
<tr>
<td>Ethnic</td>
<td>Western</td>
<td>Western</td>
<td>Asian</td>
<td>Asian</td>
<td>Western</td>
<td>Western</td>
</tr>
<tr>
<td>Method</td>
<td>HR-ARM</td>
<td>HR-ARM</td>
<td>HD-ARM</td>
<td>HR-ARM</td>
<td>HR-ARM</td>
<td>HD-ARM</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Given</td>
<td>Given</td>
<td>Given</td>
<td>Sandhill</td>
<td>MMS</td>
<td>Given</td>
</tr>
<tr>
<td>Variables</td>
<td>Mean ± SEM</td>
<td>10th, 90th percentile</td>
<td>Mean ± SEM</td>
<td>10th, 90th percentile</td>
<td>95% CI</td>
<td>Median</td>
</tr>
<tr>
<td>Maximum resting pressure</td>
<td>88 ± 3</td>
<td>68, 122</td>
<td>63 ± 5</td>
<td>33, 91</td>
<td>68.5 ± 2.4</td>
<td>63.6-73.4</td>
</tr>
<tr>
<td>Mean resting pressure</td>
<td>167 ± 6</td>
<td>115,209</td>
<td>162 ± 12</td>
<td>99,248</td>
<td>167.4 ± 8.4</td>
<td>150.5-184.3</td>
</tr>
<tr>
<td>Maximum squeeze pressure</td>
<td>3.6 ± 0.1</td>
<td>2.8, 4.4</td>
<td>3.5 ± 0.2</td>
<td>2.4, 4.5</td>
<td>3.5 ± 0.1</td>
<td>3.3-3.7</td>
</tr>
<tr>
<td>HPZ length (cm)</td>
<td>12 ± 1</td>
<td>3, 23</td>
<td>14 ± 3</td>
<td>3, 23</td>
<td>14.7 ± 0.8</td>
<td>13.2-16.3</td>
</tr>
</tbody>
</table>

**Table 2. Normal Values of High-resolution and High-definition Anorectal Manometry in Women**

- HPZ, high pressure zone; F, female; HR-ARM, high-resolution anorectal manometry; HD-ARM, high-definition anorectal manometry; SEM, standard error of the mean; SD, standard deviation; IQR, interquartile range; Min, minimum; Max, maximum; CI, confidence interval.
Principles of treatment

→ Therapy according to etiology
  - Anorectal problem?
  - Concomitant medical conditions?

Education + self management

Biofeedback

Incontinence in the setting of diarrhea: Identify and treat underlying disease!
Bulking agents

**Psyllium**
1-2x 1-2 KL/d in Aq

**Sterculiae gummi**

- **Metamucil®, Laxiplant soft®**
  - Plantaginis-ovatae
  - stool consistency ↑

- **Normacol®, Colosan® mite**

  Approved for constipation, Transit time ↓

CAVE: Meteorism

Bharucha, Gastroenterology 2003; 124:1672-8
Bulking agents - evidence

RCT, prospective, single-blind  
n=39, FI with loose stools  
25g Metamucil / 25g Gummi arab. / Plac.

RCT, doubleblind cross-over  
n=36, 2x6 weeks Loperamid 2x2 mg +  
low fiber vs. 2x1 TL Psyllium p.o.

8d Baseline  | 31d Fiber

<table>
<thead>
<tr>
<th>Normal food</th>
<th>Psyllium</th>
<th>Arabicum</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>liquid</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>loose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>formed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hard</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

p < 0.002

FISI

<table>
<thead>
<tr>
<th>baseline</th>
<th>low fiber</th>
<th>Psyllium</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>18</td>
<td>19</td>
</tr>
</tbody>
</table>

FIQoL

|           | 3.1       | 3.5       | 3.5       |

Bliss DZ, Nurs Res 2001; 50:203-13

Lauti M, Colorectal Dis 2008; 10:553-62
Loperamid

Loperamid (Imodium®)

- 3(-4)x 2-4 mg/d, titrate, Sirup!
- 30 min prior to meals and social events

- Stool weight ↓
- Stool frequency ↓
- Stool consistency ↑
- Incontin. episodes ↓
- Urgency episodes ↓

Read M et al., Dig Dis Sci 1982; 27:807-14
Loperamid: Visceral perception

RCT, doubleblind, n=10
obese patients on 3x120 mg Orlistat (Xenical® = lipase inhibitor),
Loperamid 2, 4 oder 6 mg/d vs. Placebo, cross-over for 2 Wochen

Fox M et al., Dig Dis Sci 2005; 50:1576-83
Medikamentöse Therapie

Phenylephrin - Stimulates α1-adrenergic innervation

- Sphincter tone ↑

- Phenylephrin 30%-Gel, topisch

- Clonidine 2 x 0,1 mg/d

Bharucha, Gastroenterology 2003; 124:1672-8

• Catapresan® - α2-receptor agonist

- Diarrhea episodes ↓

- FI = Insufficient effects and data!

In CH/D no formulation available!

Bharucha, Clin Gastroenterol Hepatol 2014; 12:843-51 e2
Biofeedback

prospective RCT

n=108 patients with fecal incontinence non-responding to medication

Adequate relief @ 3 month follow-up (persisting for 1 year)

Biofeedback: 79%
PFE: 41%

Clear superiority for biofeedback compared with pelvic floor exercises

Heymen S et al., Dis Colon Rectum 2009; 52:1730-7
Biofeedback: Long term results

Prospective RCT

n=105 pat. with fecal incontinence nonresponding to medical therapy

Stool frequency/wk

<table>
<thead>
<tr>
<th></th>
<th>pre</th>
<th>post</th>
<th>1 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.4</td>
<td>11.8</td>
<td>11.4</td>
<td></td>
</tr>
</tbody>
</table>

Incontinence episodes/wk

<table>
<thead>
<tr>
<th></th>
<th>pre</th>
<th>post</th>
<th>1 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3</td>
<td>1.3</td>
<td>1.3</td>
<td></td>
</tr>
</tbody>
</table>

Patient satisfaction

Summary: Determinants of continence

- **Structural**: Reservoir volume, Rectocele
- **Sphincter**: Pressure, Squeeze duration
- **Function**: Anorectal Perception
- **Stool**: Consistency
Anorectal function tests

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