Recurrent Rectal Prolapse = RRP

Colo-rectal unit
Surgery department
“Soroka” Medical center
Dr. Ruthie Gold-Deutch
Dr. Ilia Pinski
First Admission- 9/2010

30 years old female
Lives in Psychiatric institution- “Rotem house”
Epilepsy s/p Head trauma in childhood
Schizo-affective disorder
Personality disorder –Cluster B – Borderline Histrionic-Regular medication
**Obsessive recurrent coughs for years**
Rectal prolapse –Rectal bleeding-Anemia
No pregnancies
Altemeier Operation - Perineal rectosigmoidectomy – First operation -9/10
Uneventful postoperative course
Second admission - 9/12/2010

Recurrent rectal prolapse
Rectal bleeding and pain
Difficulty emptying
Abdominal pain

Physical examination- Full rectal prolapse –reducible , rectal bleeding
Altemeier Operation –Perineal rectosigmoidectomy- Second operation – 16/12/2010
Anterior and posterior Puborectalis muscle plication
Uneventful postoperative course
Third admission - 2/4/2011

Recurrent rectal prolapse
Fecal incontinence
Rectal bleeding
Physical examination- Full rectal prolapse – reducible, rectal bleeding

Patulus anus
Anal sphincter – no tonus

?
Surgical management of rectal prolapse.


Madiba TE, Baig MK, Wexner SD

Rectal prolapse=Procidentia- protrusion of the rectum beyond the anus.

- Complete or full-thickness, External rectal prolapse
- Mucosal prolapse
- Occult (internal) rectal prolapse = Rectal Intussusception
Risk Factors for rectal Prolapse

- **General factors**
- Advancing age
- Increasing body mass index
- Menopause
- Low socioeconomic status
- Increased intra-abdominal pressure

**Chronic cough** caused by smoking, chronic lung disease

- straining with chronic constipation or repeated heavy lifting

- **Obstetric**
  - Current pregnancy, previous prolonged labor, instrumental delivery, episiotomy
  - increasing parity, weight of babies

- **Previous surgery**
  - Hysterectomy, previous prolapse surgery
  - (Cesarean delivery may not prevent prolapse)
Diagnoses of habit cough or psychogenic cough can be made only after an extensive evaluation is performed that includes ruling out tic disorders and uncommon causes of chronic cough, and when cough improves with behavior modification or psychiatric therapy.
Aims of surgical management –
• Restoring physiology by correcting the prolapse
• Improving continence and/or constipation
• With acceptable morbidity/mortality and recurrence rates.
Treatment of RP

- to narrow
- to suspend
- to wrap
- to fix
- to encircle
- to plicate
- to resect
Surgical management of RP

Perineal approaches
- Delorme procedure
- Perineal rectosigmoidectomy (Altemeier operation)+/-Levatorplasty
- Thiersch procedure- anal encirclement

Abdominal approaches open/laparoscopy
- Suture Rectopexy
- Prosthetic or Mesh Posterior Rectopexy
- Ripstein Procedure (Anterior Sling Rectopexy)
- Resection Rectopexy-Frykman-Goldberg procedure
- Laparoscopic Rectopexy
Practice parameters for the management of RP
M.Varma, J.Rafferty, W.D.Buie
Disease of colon and rectum 2011; 54:1339-1346
Prepared by the standards practice task force of the American society of colon and rectal surgeons

1B
Young
Acceptable risk
Abdominal rectal fixation
Morbidity/mortality
3-9%
recurrence
anesthesia
GA

1C
Elderly
Comorbidities
Long prolapse/Incarcerated
Perineal Rectosigmoidectomy +/- levator plasty *
16-30%
RA/block

1C
Short Prolapse
Delorme Procedure
10-15%
RA/block
Practice parameters for the management of RP
M.Varma, J.Rafferty, W.D.Buie
Disease of colon and rectum 2011; 54:1339-1346
Prepared by the standards practice task force of the American society of colon and rectal surgeons

- Suture rectopexy: Recurrence 3-9% constipation
- Posterior mesh rectopexy: Recurrence <5% constipation
- Anterior mesh rectopexy Ripstein: Recurrence <5% constipation
- Rectopexy+ Resection: Recurrence constipation
- Lateral Ligaments division: Recurrence constipation
- Laparoscopic surgery
- Robotic surgery
Treatment for RRP - What Is the Next Good Option?

- Perineal approach
- Abdominal approach
Aim – To assess the clinical and functional outcome of surgery for RRP and compare it to patients who underwent an initial operation for rectal prolapse.
Recurrent Rectal Prolapse—What Is the Next Good Option?
Dis Colon Rectum, 2000;43: 1273-6

Table 2.
Numbers of Procedures Performed for Recurrent Rectal Prolapse

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Primary Procedure</th>
<th>Secondary Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perineal rectosigmoidectomy</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Rectopexy</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Delorme procedure</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Anal encirclement</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Resection with rectopexy</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3.
Preoperative Physiologic Findings

<table>
<thead>
<tr>
<th>Manometric Findings</th>
<th>Recurrent Rectal Prolapse</th>
<th>Primary Rectal Prolapse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean resting pressure (mmHg)</td>
<td>28 ± 18</td>
<td>36 ± 22</td>
</tr>
<tr>
<td>Maximum resting pressure (mmHg)</td>
<td>59 ± 50</td>
<td>52 ± 27</td>
</tr>
<tr>
<td>Mean squeeze pressure (mmHg)</td>
<td>35 ± 18</td>
<td>43 ± 21</td>
</tr>
<tr>
<td>Maximum squeeze pressure (mmHg)</td>
<td>65 ± 36</td>
<td>72 ± 37</td>
</tr>
<tr>
<td>High pressure zone (cm)</td>
<td>2 ± 2</td>
<td>2 ± 0.3</td>
</tr>
<tr>
<td>Sensitivity (cc)</td>
<td>32 ± 20</td>
<td>38 ± 33</td>
</tr>
<tr>
<td>Capacity (cc)</td>
<td>118 ± 73</td>
<td>119 ± 57</td>
</tr>
<tr>
<td>Compliance (cc/mmHg)</td>
<td>10 ± 10</td>
<td>9 ± 8</td>
</tr>
<tr>
<td>Rectoanal inhibitory reflex (positive, %)</td>
<td>52</td>
<td>52</td>
</tr>
</tbody>
</table>
Recurrent Rectal Prolapse—What Is the Next Good Option?
Dis Colon Rectum, 2000;43: 1273-6

Table 4.
Defecographic and Electromyographic Findings in the Two Groups

<table>
<thead>
<tr>
<th></th>
<th>Recurrent Rectal Prolapse</th>
<th>Primary Rectal Prolapse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defecographic findings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anorectal angle (degrees)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resting</td>
<td>117 ± 25</td>
<td>114 ± 21</td>
</tr>
<tr>
<td>Squeeze</td>
<td>102 ± 28</td>
<td>102 ± 29</td>
</tr>
<tr>
<td>Pushing</td>
<td>136 ± 24</td>
<td>126 ± 23</td>
</tr>
<tr>
<td>Perineal descent (cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resting</td>
<td>6 ± 3</td>
<td>5 ± 4</td>
</tr>
<tr>
<td>Squeeze</td>
<td>5 ± 3</td>
<td>4 ± 4</td>
</tr>
<tr>
<td>Pushing</td>
<td>8 ± 3</td>
<td>8 ± 4</td>
</tr>
<tr>
<td>Electromyographic findings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscle injury (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pudendal nerve terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor latency (mm/sec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>1.9 ± 0.9</td>
<td>2.2 ± 0.8</td>
</tr>
<tr>
<td>Right</td>
<td>1.8 ± 0.9</td>
<td>2.2 ± 0.5</td>
</tr>
</tbody>
</table>
Recurrent Rectal Prolapse—What Is the Next Good Option?  
Dis Colon Rectum, 2000;43:1273-6

| Table 6.  
| Results of Surgery  
<table>
<thead>
<tr>
<th>Result</th>
<th>Recurrent Rectal Prolapse</th>
<th>Primary Rectal Prolapse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood loss during surgery (cc)</td>
<td>210 ± 103</td>
<td>232 ± 139</td>
</tr>
<tr>
<td>Resection length of bowel (cm)</td>
<td>25.1 ± 19.3</td>
<td>24.5 ± 14.0</td>
</tr>
<tr>
<td>Operative time (minutes)</td>
<td>57.0 ± 32.8</td>
<td>56.3 ± 38.8</td>
</tr>
<tr>
<td>Hospital stay (days)</td>
<td>5.4 ± 2.5</td>
<td>6.9 ± 2.8</td>
</tr>
<tr>
<td>Morbidity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anastomotic stricture</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Anastomotic leak</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Wound infection</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Mortality (%)</td>
<td>0</td>
<td>1 (3.7)</td>
</tr>
<tr>
<td>Recurrence (%)</td>
<td>4 (14.8)</td>
<td>3 (11.1)</td>
</tr>
<tr>
<td>Mean recurrent time (months)</td>
<td>24.9 ± 15.4</td>
<td></td>
</tr>
<tr>
<td>Follow-up (months)</td>
<td>12.2 ± 16.9</td>
<td>10.8 ± 11.0</td>
</tr>
<tr>
<td>Postoperative ICS (0–20)</td>
<td>2.8 ± 4.8</td>
<td>1.5 ± 2.7</td>
</tr>
</tbody>
</table>

ICS = incontinence score.9
Recurrent Rectal Prolapse—What Is the Next Good Option?
Dis Colon Rectum, 2000; 43: 1273-6

Overall success rate for RRP - 85.2%

Conclusions-
• The outcome of surgery for rectal prolapse is similar in cases of primary or recurrent prolapse.
• The same surgical options are valid in both scenarios
• Perineal procedures for RRP had as good a success rate as was found after primary prolapse repair
• Recurrent prolapse may be caused by inadequate mobilization and resection of the redundant rectum and sigmoid in perineal proctosigmoidectomy or incomplete mucosectomy in Delorme's procedure.
Surgical Treatment of RRP
A Thirty-Year Experience
G. R. Hoot, T. L. Hull, V. W. Fazio.

Perineal Approach
9 pt’s

Abdominal approach
15 pt’s

RRP
24 pt’s

4 Perineal Approach

25 Abdominal approach

1963-1993
Median age was 56 (range, 18-88) y
Median follow-up 6.75 (range, 0.08-17) y
Median duration to recurrence 2 y
10 recurrence (34%) within 7 months
Surgical Treatment of RRP
A Thirty-Year Experience
G. R. Hoot, T. L. Hull, V. W. Fazio.

Aims-
1) To examine the possible causal factors for recurrence, including possible technical factors
2) To examine the treatment options available and how they are affected by initial prolapse surgery
3) To examine the outcome after surgery for RRP
### Table 1.
Original Prolapse Operation (n = 24)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perineal</td>
<td></td>
</tr>
<tr>
<td>Anal encirclement</td>
<td>3</td>
</tr>
<tr>
<td>Delorme's</td>
<td>1</td>
</tr>
<tr>
<td>Perineal procedure (unspecified)</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
</tr>
<tr>
<td>Abdominal</td>
<td></td>
</tr>
<tr>
<td>Frykman-Goldberg</td>
<td>2</td>
</tr>
<tr>
<td>Anterior resection</td>
<td>1</td>
</tr>
<tr>
<td>Ripstein's</td>
<td>10</td>
</tr>
<tr>
<td>Rectal suspension</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

### Table 3.
Procedures Performed for RRP (n = 29)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal</td>
<td></td>
</tr>
<tr>
<td>Frykman-Goldberg ± sphincter repair</td>
<td>3</td>
</tr>
<tr>
<td>Anterior resection</td>
<td>3</td>
</tr>
<tr>
<td>Ripstein's</td>
<td>18</td>
</tr>
<tr>
<td>Rectal suspension</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
<tr>
<td>Perineal</td>
<td></td>
</tr>
<tr>
<td>Anal encirclement</td>
<td>2</td>
</tr>
<tr>
<td>Alternieer ± sphincter repair</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
</tr>
</tbody>
</table>

### Table 2.
Preoperative and Postoperative Bowel Symptoms (n = 24)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Preoperative</th>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incontinence</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Constipation</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

### Table 5.
Reason for Recurrence of Rectal Prolapse (n = 29)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesh pulled off rectum</td>
<td>2</td>
</tr>
<tr>
<td>Mesh pulled off sacrum</td>
<td>4</td>
</tr>
<tr>
<td>Loose sling with rectum telescoping through sling</td>
<td>2</td>
</tr>
<tr>
<td>Division of rectal sling for pain</td>
<td>1</td>
</tr>
<tr>
<td>Mesh placed too high</td>
<td>2</td>
</tr>
<tr>
<td>Thietsch wire removed</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
</tr>
</tbody>
</table>
Conclusions-

• It is assumed that the similar pathophysiology is occurring with RRP as with the first occurrence

• Abdominal approach has a lesser recurrence rate than the perineal approach for RRP

• Failure of the mesh was the most common identifiable reason for failure

• Preoperative incontinence and constipation were largely unchanged by RRP operation (60%)
Management of RRP: Surgical Approach Influences Outcome

Mean duration to recurrence 33 months
29% recurrence within the first 7 months
Conclusions-
Recurrence rates are lower after an abdominal vs. perineal repair
• More accurate determination of whether to resect or pull up and fixate additional redundant bowel that may otherwise prolapse
Same benefits persist in recurrent prolapse surgery
Each patient with RRP should be individually assessed, and suggest abdominal repair if the his risk profile permits it.
## Management of RRP: Surgical Approach Influences Outcome


*Dis Colon Rectum 2006; 49: 440–445*

<table>
<thead>
<tr>
<th></th>
<th>Perineal approach</th>
<th>Abdominal approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of complications</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Anastomotic stricture</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Anastomotic leak/abscess</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Severe constipation</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Intractable diarrhea</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Overall complication %</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>
Management of RRP: Surgical Approach Influences Outcome

6 pt’s developed anastomotic complications → stricture, leak

• Surgeon should be wary to perform an Altemeier operation after a rectosigmoid resection has been performed (or Vice versa). This could leave a devascularized segment of rectum

• Recommend to preserve the Superior Hemorrhoidal artery in cases of resection/rectopexy.
14 pt’s (11♀)
Age from 22 - 92 years (mean- 68y)
Underwent operative correction of RRP (1984 -1993)
Average time to recurrence was 14 months (range- 6-60m)
Average length of follow-up -50 months (range, 9-115m)
### Management of RRP


Dis Colon Rectum, July 1997; Vol.40 (7): 832-4

<table>
<thead>
<tr>
<th>Operation for initial RP</th>
<th>Operation for RRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perineal proctectomy (10)**</td>
<td>Perineal proctectomy and levatorplasty (5)**</td>
</tr>
<tr>
<td>Sacral rectopexy (3)</td>
<td>Anterior resection with rectopexy (1)</td>
</tr>
<tr>
<td>Anterior resection with rectopexy (1)</td>
<td>Anal encirclement (1)</td>
</tr>
<tr>
<td>Anal encirclement (2)</td>
<td>Perineal proctectomy and levatorplasty (1)</td>
</tr>
<tr>
<td>Anterior resection (1)</td>
<td>Anterior resection with rectopexy (1)</td>
</tr>
<tr>
<td>Delorme's procedure (1)*</td>
<td>Perineal proctectomy (1)*</td>
</tr>
<tr>
<td>Anterior resection (1)</td>
<td>Delorme's procedure (1)</td>
</tr>
</tbody>
</table>
Management of Recurrent Rectal Prolapse
Dis Colon Rectum, July 1997; Vol.40 (7): 832-4

Slough of rectal mucosa -1 pt’
Underwent AR with rectopexy for RRP after perineal proctectomy with levatorplasty
Ischemia of the rectal segment between the two anastomoses.
Unless the previous anastomosis is resected in a procedure for RRP, resectional procedures should be avoided.
No ischemic segment will be present if another perineal proctectomy is performed
<table>
<thead>
<tr>
<th>Operation for initial RP</th>
<th>Operation for RRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perineal proctectomy (10)**</td>
<td>Perineal proctectomy and levatorplasty (5)**</td>
</tr>
<tr>
<td>Anal encirclement (2)</td>
<td>Sacral rectopexy (3)</td>
</tr>
<tr>
<td>Delorme's procedure (1)*</td>
<td>Anterior resection with rectopexy (1)</td>
</tr>
<tr>
<td>Anterior resection (1)</td>
<td>Anal encirclement (1)</td>
</tr>
</tbody>
</table>

*Cases marked with an asterisk indicate rare occurrences.
**Cases marked with an asterisk indicate more frequent occurrences.
Conclusions-

- Surgical management of RRP can be expected to alleviate the prolapse, but not necessarily fecal incontinence.
- Perineal proctectomies can be safely repeated.
- Despite the familiarity and high success rate of abdominal approaches in the repair of rectal prolapse, it is advisable to opt for a perineal approach in high-risk patients.
- Advised that surgeons choose the procedure with which they are most familiar.
Practice parameters for the management of rectal prolapse
M.Varma, J.Rafferty, W.D.Buie
Disease of colon and rectum 2011;54:1339-1346
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TRUS – sphincters defect
Anal manometry
PNTML
Defecography
Colonoscopy
CTT
(barium enema)
Urodynamics
Physiologic testing -

- To identify other important pelvic floor pathology.
- To assess functional disorders – Incontinence (60%)
  - Constipation (15% - 65%)

- Preoperative manometric /EMG findings serves as reliable predictors of postoperative function in some studies.

- Anorectal physiology studied rarely change the operative strategy but they can guide treatment for associated functional abnormalities.
Surgical management of rectal prolapse.

Madiba TE, Baig MK, Wexner SD

- Chronic stretch and trauma to the sphincter by the prolapse
- Stimulation of RAIR
- Direct conduit bypassing the sphincter mechanism
- Continuous Pudendal n’s stretching
- Pudendal neuropathy (50%)
- Denervation related atrophy of the external sphincter

Incontinence 50-70%

duration / size
Surgical management of rectal prolapse.
Madiba TE, Baig MK, Wexner SD

In general patients with incontinence secondary to rectal prolapse will have improvement 2-3 months after operation.

Preoperative Anal Manometry Predicts Continence After Perineal Proctectomy for Rectal Prolapse
Dis Colon Rectum 2006; 49: 1052–1058

Despite recovery of anal sphincteric tone in many patients after repair of the prolapse, fecal incontinence persists in at least one-third of patients in most large series independent of surgical approach.
45 pt’s underwent anal manometry and PNTML testing before proctectomy with levatoroplasty.

Preoperatively -77.8% pt’s - Grade 2 or 3 fecal incontinence

33% pt’s - Obstructed defecation symptoms

PNTML testing was prolonged or undetectable in 55.6% of patients.

Abnormalities of Pudendal nerve function was not predictive of postoperative incontinence.
Preoperative Anal Manometry Predicts Continence After Perineal Proctectomy for Rectal Prolapse
Dis Colon Rectum 2006; 49: 1052–1058

Incontinence rate, 10 vs. 54 %; P = 0.004
24 pt’s were prospectively evaluated by anal manometry and PNTML before and after surgical correction of rectal prolapse

13 pt’s - LAR
11 pt’s - Retrorectal sacral fixation= RSF

Aims-
1) Assess the effect of surgical repair of rectal prolapse on anal sphincter function
2) Determine whether neurogenic injury contributes to postoperative incontinence.
PNTML Influences Surgical Outcome in Treatment of Rectal Prolapse


Dis Colon Rectum, November 1996; 1215-1221

**Figure 1.** Effect of prolapse repair on continence. Preop = preoperative; Postop = postoperative; LAR = low anterior resection; RSF = retosacral fixation; Grade I = incontinent of gas; Grade II = incontinent of liquid stool; Grade III = incontinent of solid stool.
PNTML Influences Surgical Outcome in Treatment of Rectal Prolapse

Table 3.
Manometry: Rectal Prolapse

<table>
<thead>
<tr>
<th>Postoperative</th>
<th>Mean Maximum Resting Pressure (mmHg)</th>
<th>Mean Maximum Squeeze Pressure (mmHg)</th>
<th>Average Sphincter Length (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continent (n = 13)</td>
<td>48.5 ± 28.8</td>
<td>84.1 ± 40.8</td>
<td>2.9 ± 0.7</td>
</tr>
<tr>
<td>Preoperative</td>
<td>Postoperative</td>
<td>51.6 ± 28.5</td>
<td>114.8 ± 61.2</td>
</tr>
<tr>
<td>Incontinent (n = 11)</td>
<td>41.7 ± 13.6</td>
<td>71.2 ± 22.9</td>
<td>3.6 ± 0.4*</td>
</tr>
<tr>
<td>Preoperative</td>
<td>Postoperative</td>
<td>37.7 ± 16.1</td>
<td>68.4 ± 34.4</td>
</tr>
</tbody>
</table>

* P < 0.0001.

Figure 2. Pudendal nerve latency. Preop = preoperative;
Table 4.
Postoperative Pudendal Nerve Status

<table>
<thead>
<tr>
<th>PNTML</th>
<th>Incontinent (%)</th>
<th>Pressure (mmHg)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rest</td>
<td>Squeeze</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preoperative</td>
<td>Postoperative</td>
<td>Preoperative</td>
<td>Postoperative</td>
<td></td>
</tr>
<tr>
<td>Normal (n = 5)</td>
<td>1 (20)</td>
<td>45.2 ± 18.4</td>
<td>56.0 ± 24.7</td>
<td>86.8 ± 19.0</td>
<td>145.0 ± 58.1*</td>
<td></td>
</tr>
<tr>
<td>Unilateral abnormal (n = 8)</td>
<td>3 (38)</td>
<td>51.2 ± 31.6</td>
<td>53.7 ± 32.4</td>
<td>79.3 ± 50.8</td>
<td>94.8 ± 62.1</td>
<td></td>
</tr>
<tr>
<td>Bilateral abnormal (n = 6)</td>
<td>5 (83)</td>
<td>44.3 ± 14.2</td>
<td>43.2 ± 20.8</td>
<td>84.7 ± 37.8</td>
<td>66.5 ± 26.0*</td>
<td></td>
</tr>
</tbody>
</table>

PNTML = pudendal nerve terminal motor latency.
* P < 0.015.
Third admission -2/4/2011

Inter-Sphincteric Proctectomy + end colostomy – Third operation – 3/4/2011

Uneventful postoperative course
Descending Colostomy