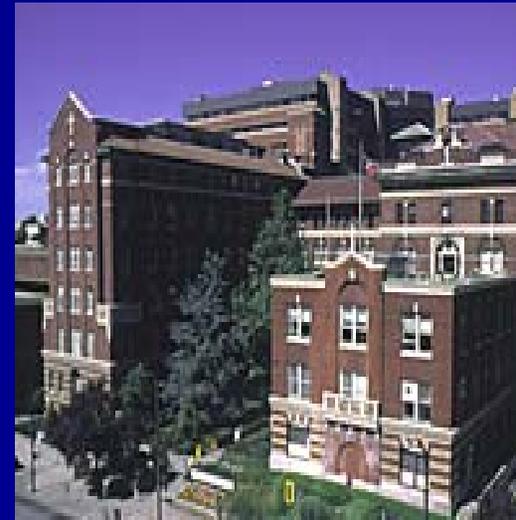# The Management of Low Rectal Cancer - Rectal Reconstruction

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UBC

Providence
HEALTH CARE

Background

- Lifetime risk of colorectal cancer is 6.5%[*]
  - Rectal cancer comprises approximately 30%[†]
- Complete rectal resection has been the preferred treatment since the early 1900s

[*]Canadian Cancer Statistics at
http://www.cancer.ab.ca/vgn/images/portal/cit_86751114/14/33/195986411niw_stats2004_en.pdf

[†]Health Canada data at
http://www.hc-sc.gc.ca/pphb-dgspsp/publicat/cdic-mcc/24-4/c_e.html

Background

- Dixon first described rectal resection and colorectal anastomosis in 1948*
- Stapling devices have facilitated lower and lower anastomoses**

* Dixon CF, *Ann Surg* 1948

** Golligher, *Surg Gynecol Obstet* 1979

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Total Mesorectal Excision

- Heald BJS 1982
  - TME
  - Standard for mid to low rectal cancer
- Kapiteijn NEJM 2001
  - LR 3% with surgery and radiation
  - LR 8% with surgery alone
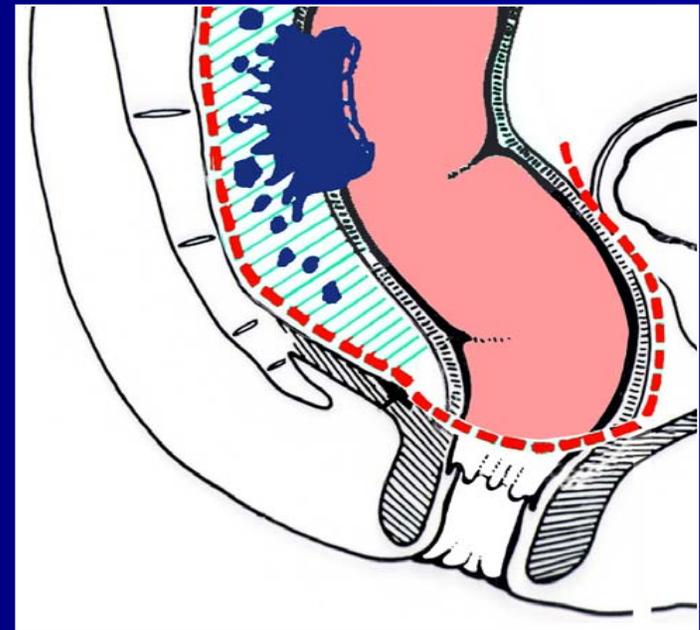
"Low Anterior Resection Syndrome" (LARS)

- McDonald and Heald, *Br J Surg* 1983
  - Constellation of problems
    - Incontinence
    - Urgency
    - Frequent Bowel Movements

- Lewis, *Dis Col Rect* 1995
  - Anastomotic height main predictor of poor function
  - Lower = Worse

LARS - Surgical Strategies

- Parc, *Br J Surg* 1986

  Lazorthes, *Br J Surg* 1986

  – Colonic J Pouch Reservoir
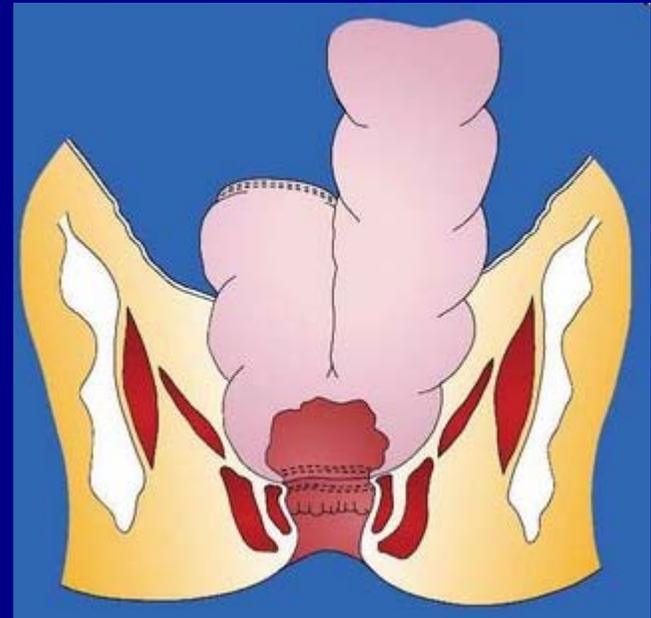
LARS - Surgical Strategies

- Huber, *Dis Col Rectum* 1999

  – Side-to-End Anastomosis
  – Initially described by Baker (1950)
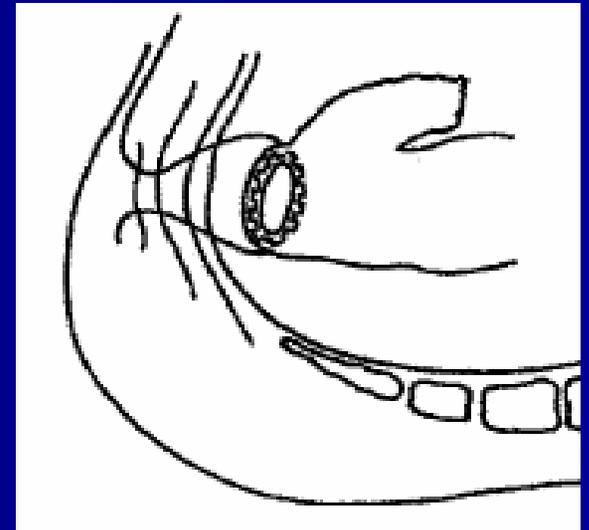
LARS - Surgical Strategies

- Z'Graggen, *Surgery* 1997

  – Transverse Coloplasty Pouch
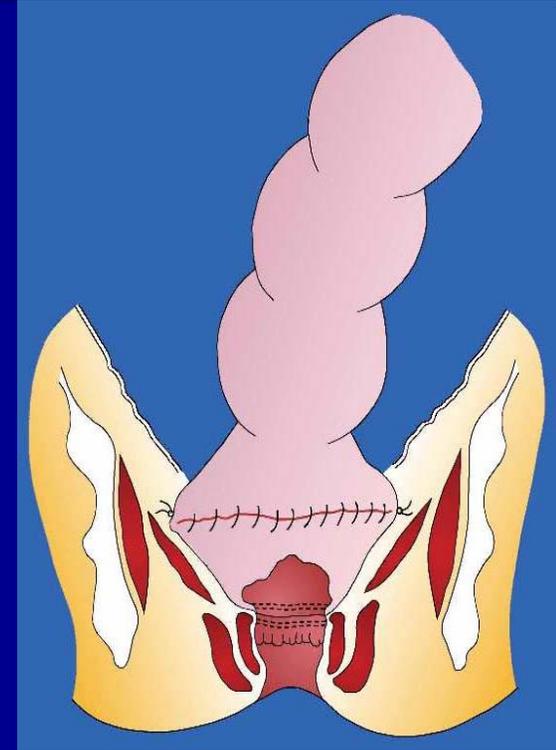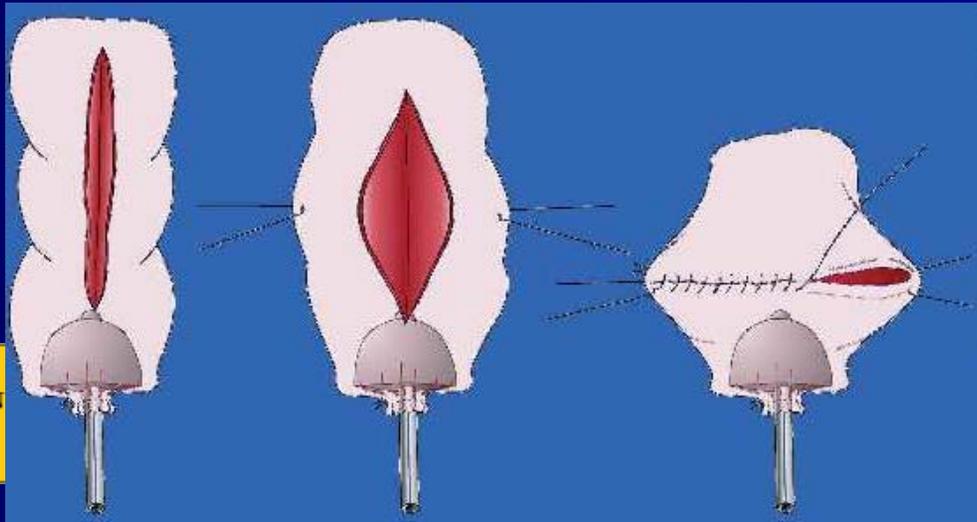
Systematic Literature Review

Brown, Fenech and McLeod

Reconstruction techniques after rectal resection for rectal cancer. Cochrane Database of Systematic Reviews, 2008 Apr 16 (2).

Outcomes

- **Primary Outcome - Bowel Function**
  - Bowel frequency
  - Urgency
  - Incomplete Evacuation
  - Anti-diarrheal Medication Use
  - Fecal Incontinence Score
- **Secondary Outcome - Complications**
  - Mortality
  - Anastomotic leak rate
  - Anastomotic stricture
  - Wound infection
  - Pneumonia/Chest Infection

Outcomes

- Early   < 8 months
- Intermediate   8-18 months
- Late   >18 months

Search Strategy

- Two independent investigators searched Medline, EMBASE and Cochrane Library (1966 - Oct 2004)

  – RCTs identified using standard search terms*

  – Combined with comprehensive topic-specific search strategy

  * Robinson and Dickersin, *Int J Epidemiology* 2002

Search Results

Cochrane Library

Medline and Cancerlit (via Ovid)

Embase

4 Articles

849 Articles

1161 Articles

23 Articles

7 Articles Excluded

•2 – Not RCT

•3 – No bowel function results

•2 – Results from same patients previously reported

16 RCTs

•9 RCTs - SCA vs. CJP

•3 RCTs – CJP vs. TCP

•4 RCTs - STE vs. CJP

Study Validity

Overall, moderate validity

Randomization

   - Process not described

Blinding

   - Pts not blind to procedure

   - Only 4/14 trials had blinded observer

Intent-To-Treat Analysis

   - No described

Straight Coloanal Anastomosis vs Colonic J Pouch

- Straight Anastomosis vs. Colonic J Pouch -
Short Term (< 8 months) Bowel Function
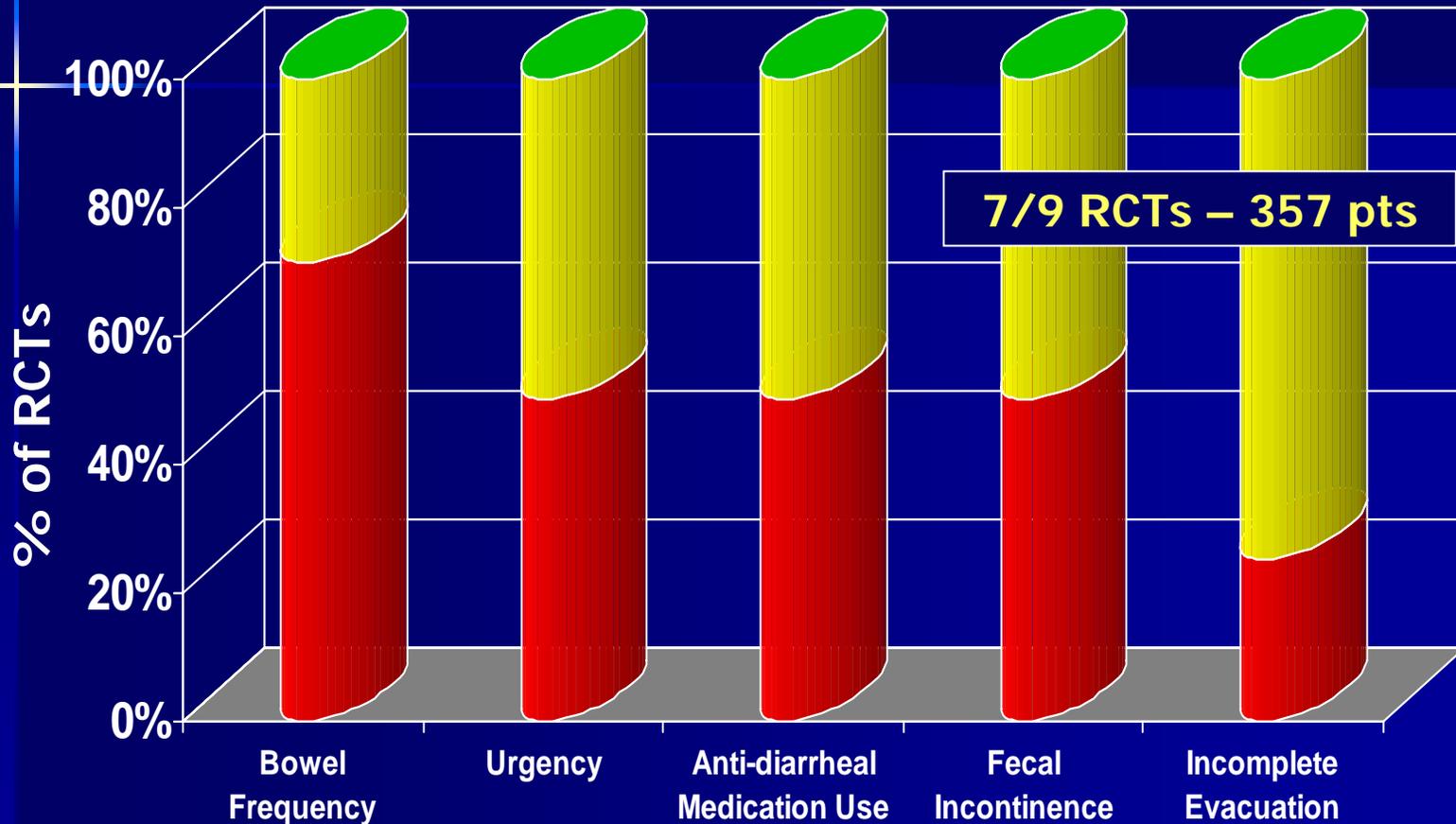
7/9 RCTs – 357 pts

% of RCTs

100%
80%
60%
40%
20%
0%

Bowel Frequency | Urgency | Anti-diarrheal Medication Use | Fecal Incontinence | Incomplete Evacuation

SCA Better Than CJP (p<0.05)
SCA Similar To CJP (p>0.05)
CJP Better Than SCA (p<0.05)

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- Straight Anastomosis vs. Colonic J Pouch - Medium Term (8-18 months) Bowel Function
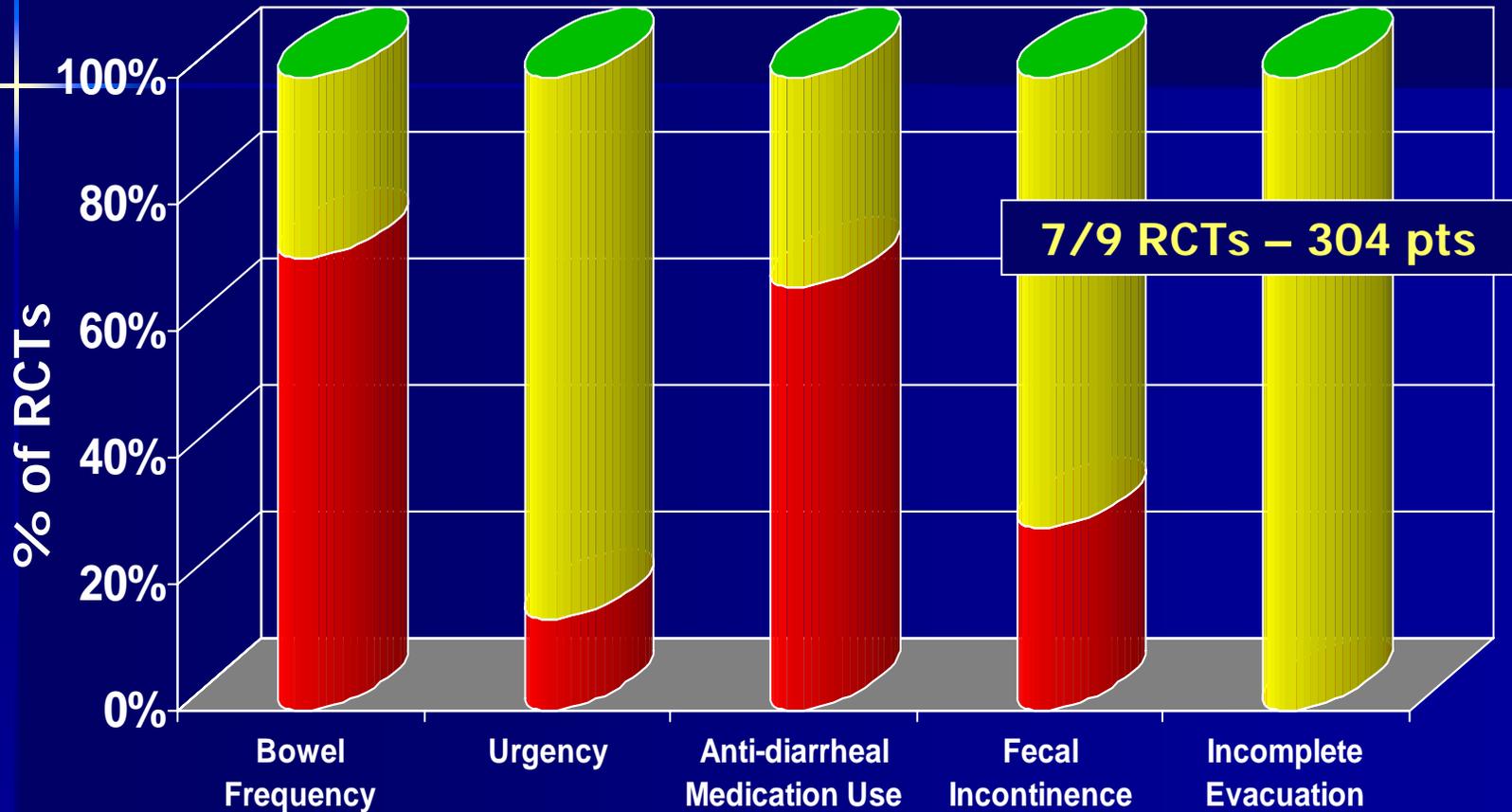
7/9 RCTs – 304 pts

Legend:
- **SCA** Better Than **CJP** (p<0.05)
- **SCA** Similar To **CJP** (p>0.05)
- **CJP** Better Than **SCA** (p<0.05)

– Straight Anastomosis vs. Colonic J Pouch –
Long Term (>18 month) Bowel Function
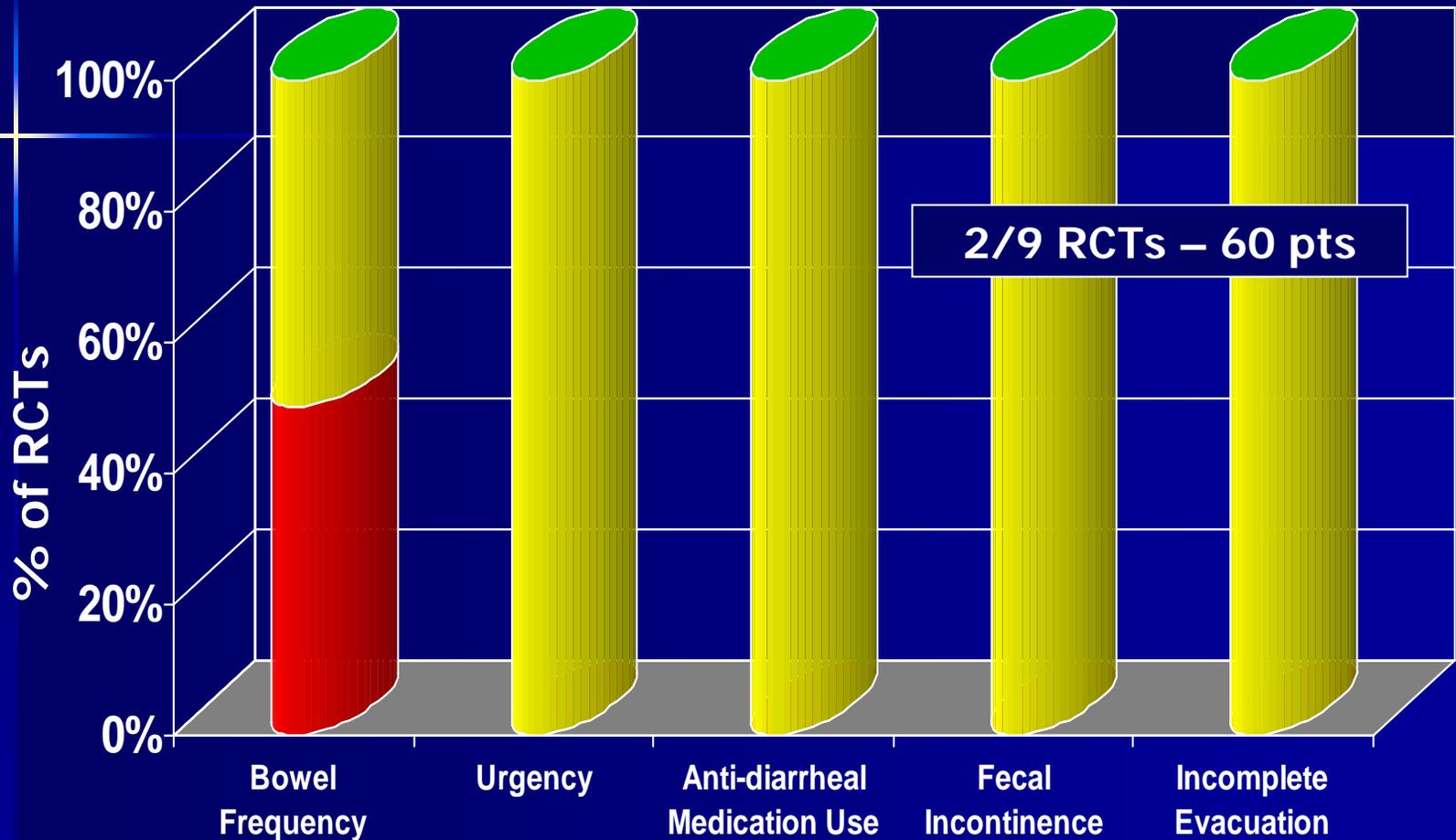
2/9 RCTs – 60 pts

% of RCTs (y-axis): 0%, 20%, 40%, 60%, 80%, 100%

Categories: Bowel Frequency, Urgency, Anti-diarrheal Medication Use, Fecal Incontinence, Incomplete Evacuation

Legend:
- **SCA** Better Than **CJP** ($p<0.05$)
- **SCA** Similar To **CJP** ($p>0.05$)
- **CJP** Better Than **SCA** ($p<0.05$)

- Straight Anastomosis vs. Colonic J Pouch -
Complications

Postoperative Mortality

Study or sub-category	OR (fixed) 95% CI
Ortiz 1995	0.32 [0.01, 8.26]
Hallbook 1996	0.28 [0.01, 7.11]
Lazorthes 1997	Not estimable
Furst 2002	1.00 [0.06, 16.61]
Oya 2002	Not estimable
Sailer 2002	0.19 [0.01, 4.07]
Machado 2003	0.33 [0.01, 8.21]
Total (95% CI)	0.36 [0.09, 1.36]

Total events: 1 (Straight Anastomosis), 6 (Colonic J Pouch)
Test for heterogeneity: Chi² = 0.71, df = 4 (P = 0.95), I² = 0%
Test for overall effect: Z = 1.51 (P = 0.13)

More Deaths with CJP   More Deaths with SCA

No Difference

Anastomotic Leak

Study or sub-category	OR (fixed) 95% CI
Ortiz 1995	1.00 [0.13, 7.94]
Hallbook 1996	8.00 [0.96, 66.68]
Lazorthes 1997	2.00 [0.17, 24.19]
Huber 1999	0.62 [0.10, 4.01]
Ho 2000	Not estimable
Furst 2002	1.00 [0.19, 5.31]
Oya 2002	Not estimable
Sailer 2002	1.38 [0.28, 6.73]
Machado 2003	1.28 [0.32, 5.07]
Total (95% CI)	1.53 [0.81, 2.90]

Total events: 26 (Straight Anastomosis), 17 (Colonic J Pouch)
Test for heterogeneity: Chi² = 3.78, df = 6 (P = 0.71), I² = 0%
Test for overall effect: Z = 1.30 (P = 0.19)

More Leaks with CJP   More Leaks with SCA

No Difference

Side to End Anastomosis vs. Colonic J Pouch

- STE vs. Colonic J Pouch -
Short Term (< 8 months) Bowel Function

3 RCTs – 196 pts

% of RCTs

100%
80%
60%
40%
20%
0%

Bowel Frequency | Urgency | Anti-diarrheal Medication Use | Fecal Incontinence | Incomplete Evacuation
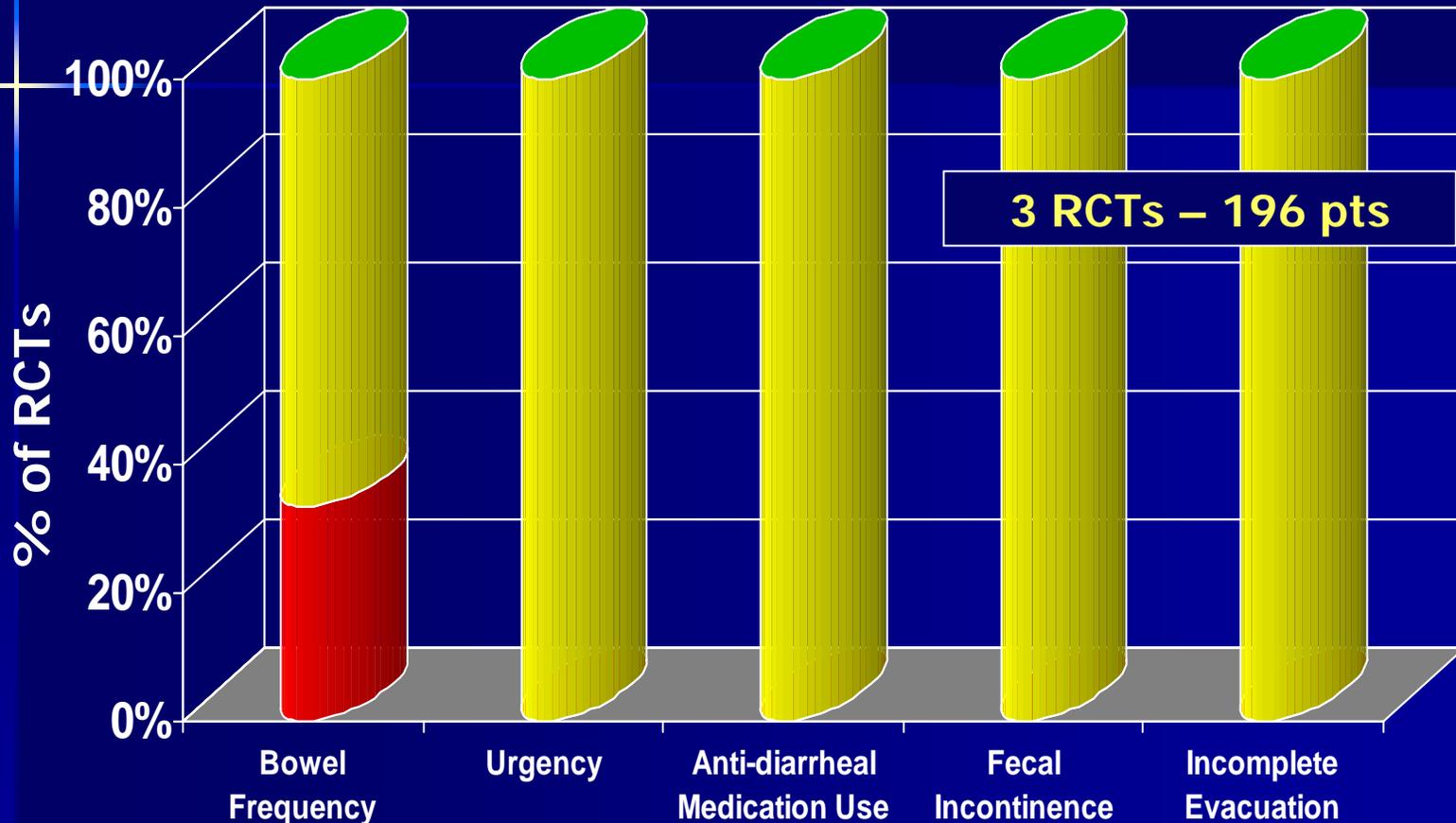
STE Better Than CJP (p<0.05)
STE Similar To CJP (p>0.05)
CJP Better Than SCA (p<0.05)

- STE vs. Colonic J Pouch -
Medium Term and Long Term Bowel Function

- **8-18 Months Follow-up**
  - 2 RCTs (n=129)
  - No difference in bowel function

- **>18 Months Follow-up**
  - 2 RCTs (n=106)
  - No difference in bowel function

-STE vs. Colonic J Pouch - Complications

Anastomotic Leak

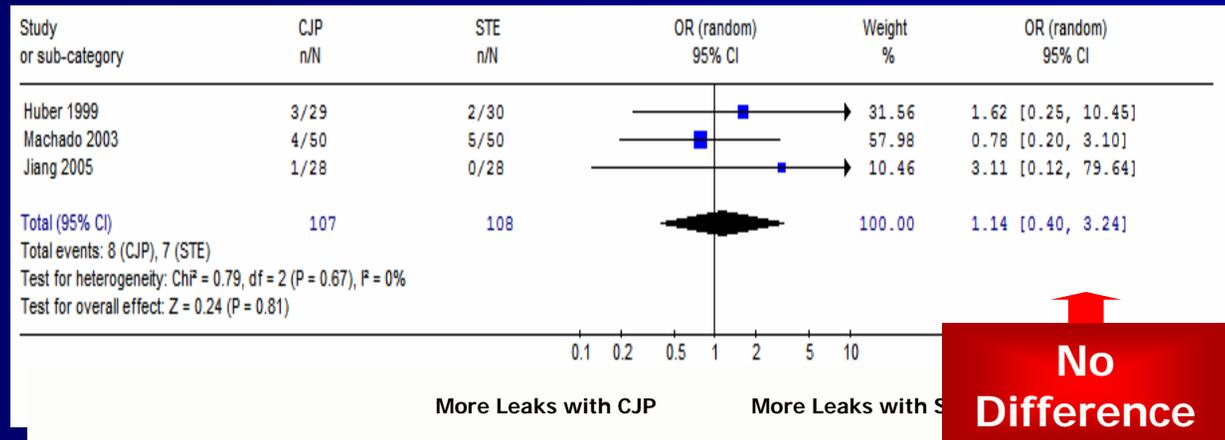| Study or sub-category	CJP n/N	STE n/N	OR (random) 95% CI	Weight %	OR (random) 95% CI
Huber 1999	3/29	2/30		31.56	1.62 [0.25, 10.45]
Machado 2003	4/50	5/50		57.98	0.78 [0.20, 3.10]
Jiang 2005	1/28	0/28		10.46	3.11 [0.12, 79.64]
Total (95% CI)	107	108		100.00	1.14 [0.40, 3.24]

Total events: 8 (CJP), 7 (STE)
Test for heterogeneity: Chi² = 0.79, df = 2 (P = 0.67), I² = 0%
Test for overall effect: Z = 0.24 (P = 0.81)

0.1 0.2   0.5   1   2   5   10

More Leaks with CJP   **More Leaks with S**

No Difference

Colonic J Pouch vs. Transverse Coloplasty

– Colonic J Pouch vs. Transverse Coloplasty –
Short Term (<8 months) Bowel Function
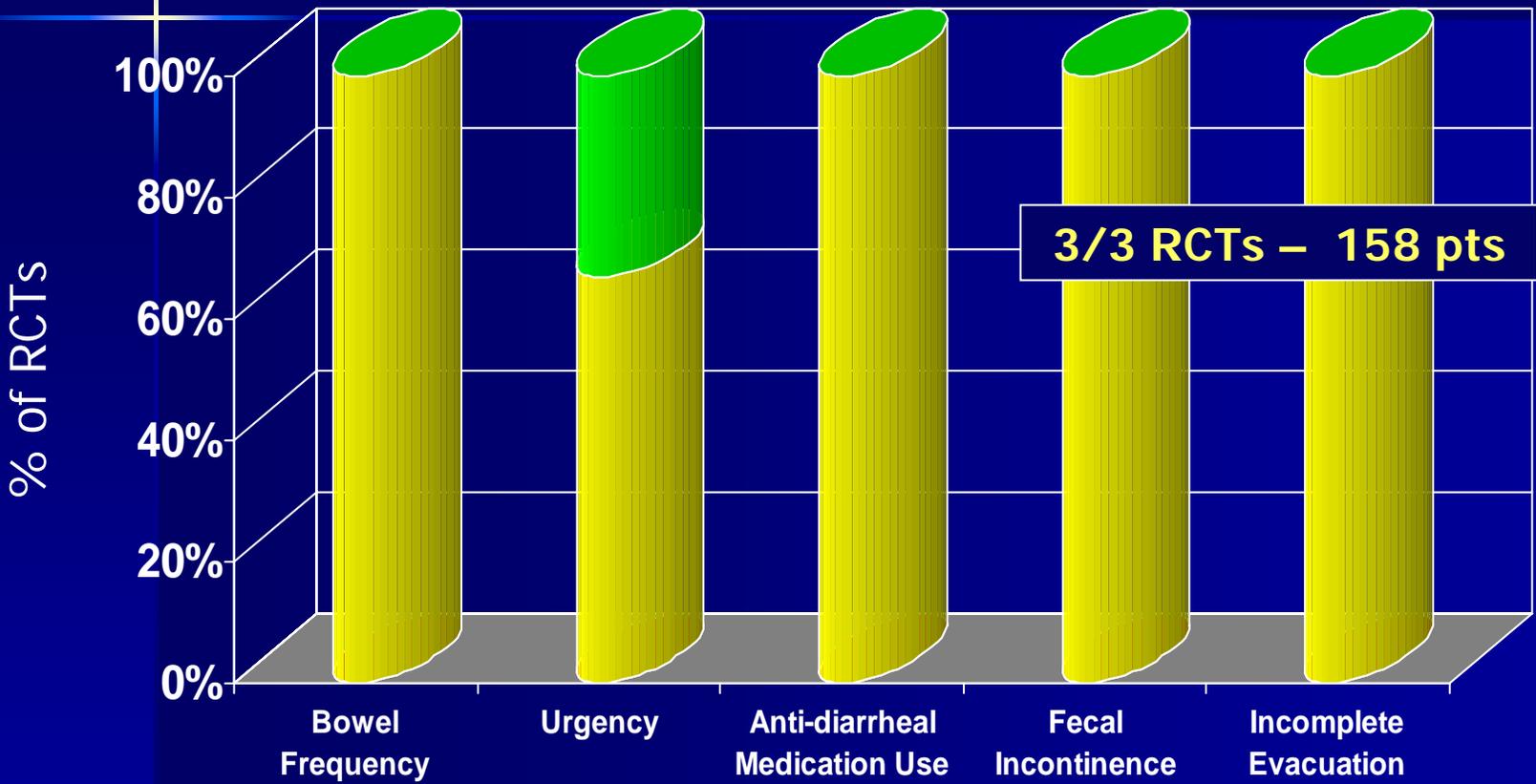
% of RCTs

| | Bowel Frequency | Urgency | Anti-diarrheal Medication Use | Fecal Incontinence | Incomplete Evacuation |

3/3 RCTs – 158 pts

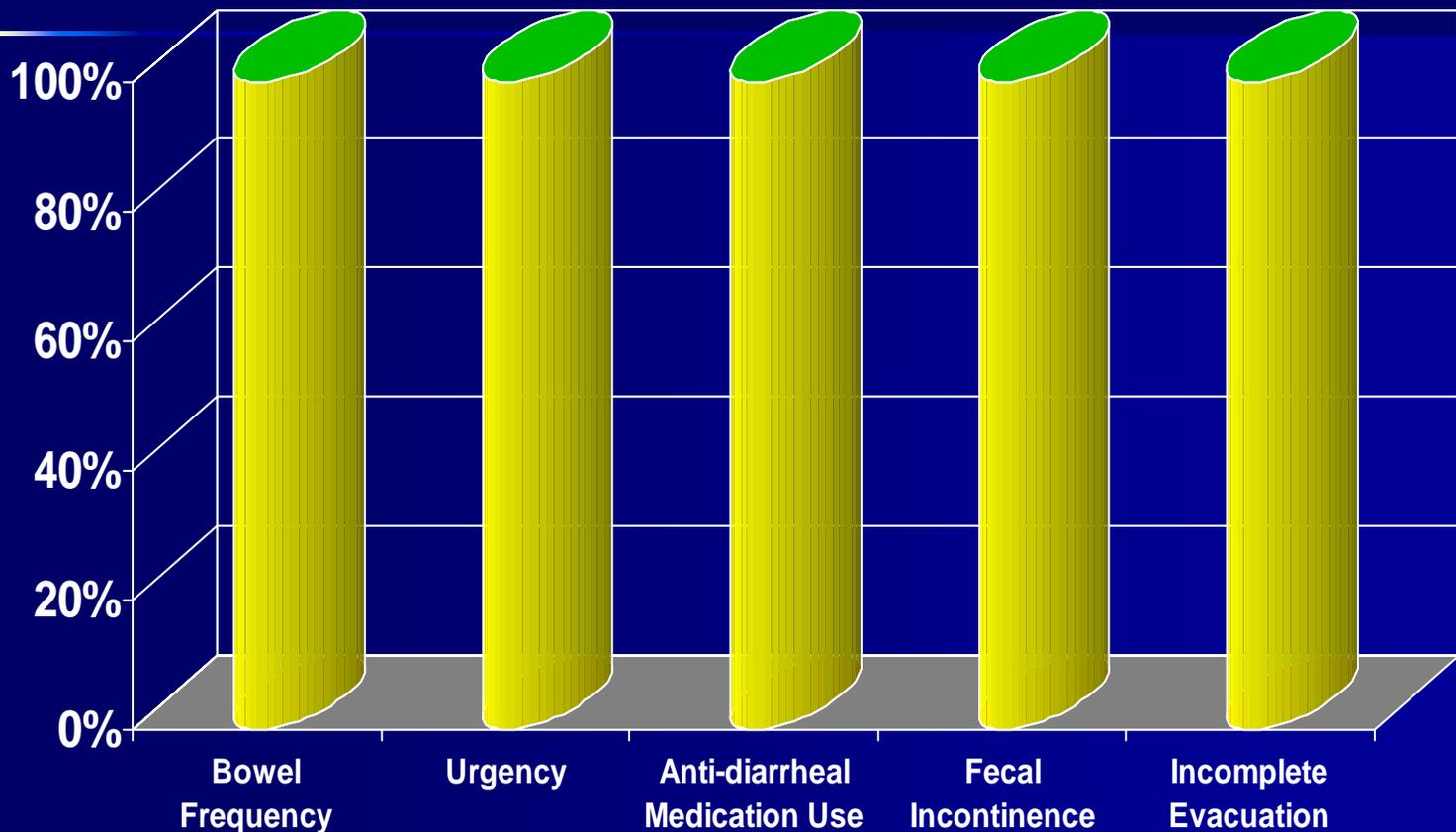- 🟩 **TCP** Better Than **CJP** ($p<0.05$)
- 🟨 **CJP** Similar To **TCP** ($p>0.05$)
- 🟥 **CJP** Better Than **TCP** ($p<0.05$)

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- Colonic J Pouch vs. Transverse Coloplasty -
Medium Term (8-18 months) Bowel Function

Chart with categories (y-axis 0% to 100%):
- Bowel Frequency
- Urgency
- Anti-diarrheal Medication Use
- Fecal Incontinence
- Incomplete Evacuation

Legend:
- **TCP** Better Than **CJP** ($p < 0.05$)
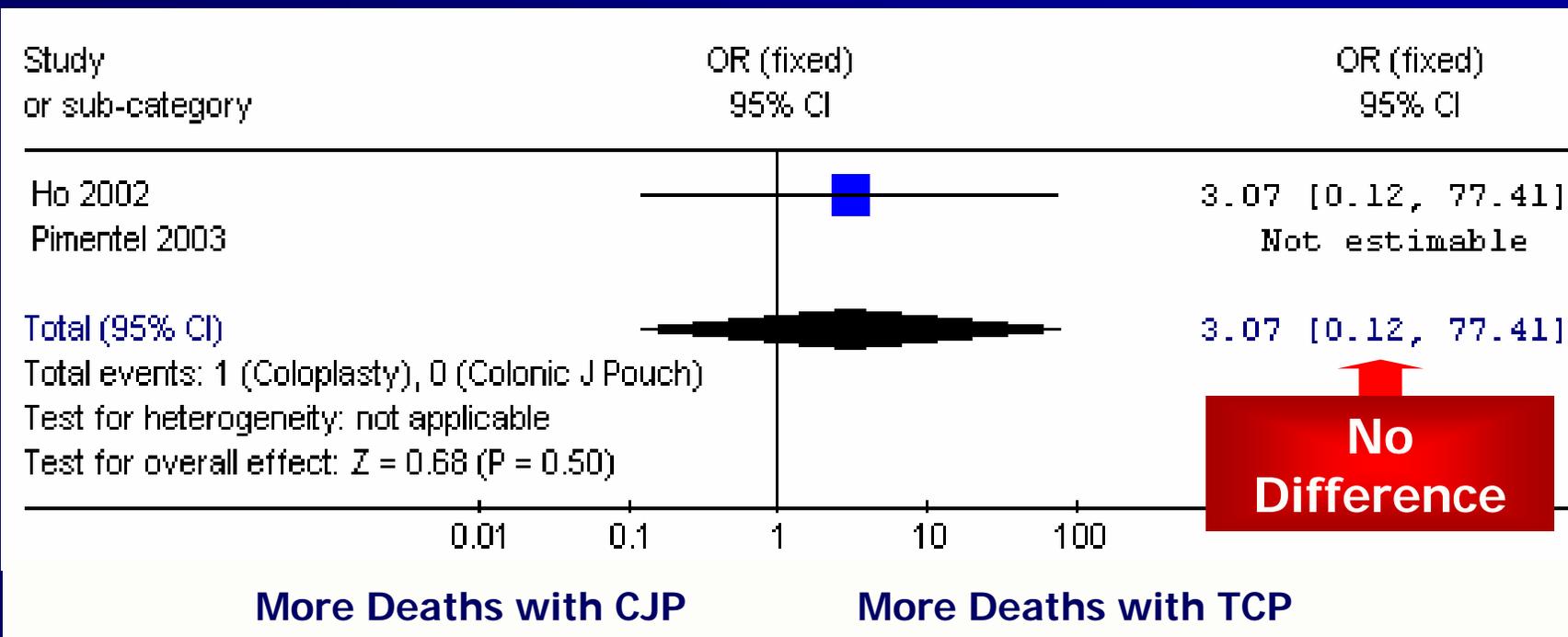- **CJP** Similar To **TCP** ($p > 0.05$)
- **CJP** Better Than **TCP** ($p < 0.05$)

2/3 RCTs – 96 pts

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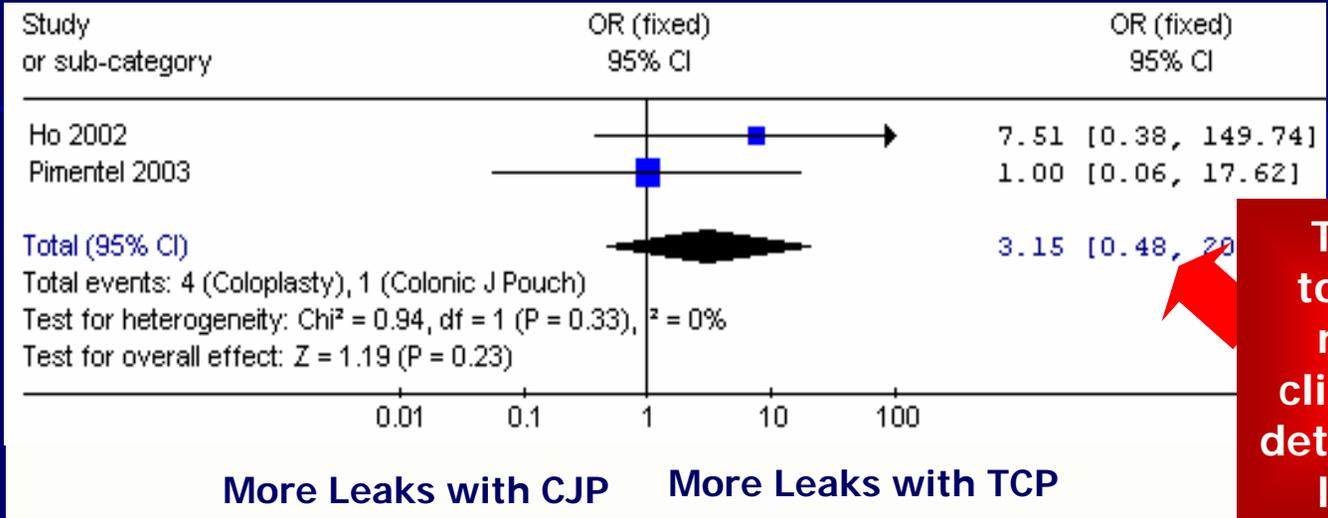
- Colonic J Pouch vs. Transverse Coloplasty -
Complications

– Colonic J Pouch vs. Transverse Coloplasty – Complications

Anastomotic Leak (Clinical)

Study or sub-category	OR (fixed) 95% CI		OR (fixed) 95% CI
Ho 2002			7.51 [0.38, 149.74]
Pimentel 2003			1.00 [0.06, 17.62]
Total (95% CI)			3.15 [0.48, 20.?]

Total events: 4 (Coloplasty), 1 (Colonic J Pouch)
Test for heterogeneity: Chi² = 0.94, df = 1 (P = 0.33), I² = 0%
Test for overall effect: Z = 1.19 (P = 0.23)

0.01   0.1   1   10   100

More Leaks with CJP   **More Leaks with TCP**

Trend toward more clinically detectable leaks

Anastomotic Leak (Clinical + Radiologic)

Study or sub-category	TCP n/N	CJP n/N	OR (random) 95% CI	Weight %	OR (random) 95% CI
Ho 2002b	7/44	0/44		29.85	17.80 [0.98, 322.04]
Furst 2003	1/20	2/20		35.30	0.47 [0.04, 5.69]
Pimentel 2003	2/15	1/15		34.85	2.15 [0.17, 26.67]
Total (95% CI)	79	79		100.00	2.37 [0.30, 18.69]

Total events: 10 (TCP), 3 (CJP)
Test for heterogeneity: Chi² = 3.71, df = 2 (P = 0.16), I² = 46.1%
Test for overall effect: Z = 0.82 (P = 0.41)

0.01   0.1   1   10   100

More Leaks with CJP   **More Leaks with TCP**

No Significant difference in leaks

Summary

- **Colonic J pouch** results in:
  - Better short and medium term bowel function than Straight Colonal Anastomosis
  - Equivalent long term bowel function
  - Postoperative complications similar to straight
- **Side to End Anastomosis** results in:
  - Similar short, medium and long term bowel function compared to Colonic J Pouch

Summary

- **Transverse Coloplasty** demonstrates similar bowel function outcomes as CJP, but further study needed to clarify relative risk of anastomotic leak