Open Incisional Hernia Repair:

The Reigning Gold Standard

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Resident Debate

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Objectives

- Incisional Hernia - The Problem
- Historical Prospective - The 'Good' Old Days
- Open Repair - The Gold Standard
- Laparoscopic Repair - The Newfangled Approach
- Conclusions

The Problem

- Incisional hernias occur in 25% patients after laparotomy
- Associated with pain, incarceration, bowel obstructions
- 250,000 repairs each year in the US

Historical Data

Tissue repair resulted in recurrence rates as high as 63% after 10yr follow-up.

Prosthetic mesh allows for tension-free repair with improved recurrence rates.

Burger JW, et al. Ann Surg 2004

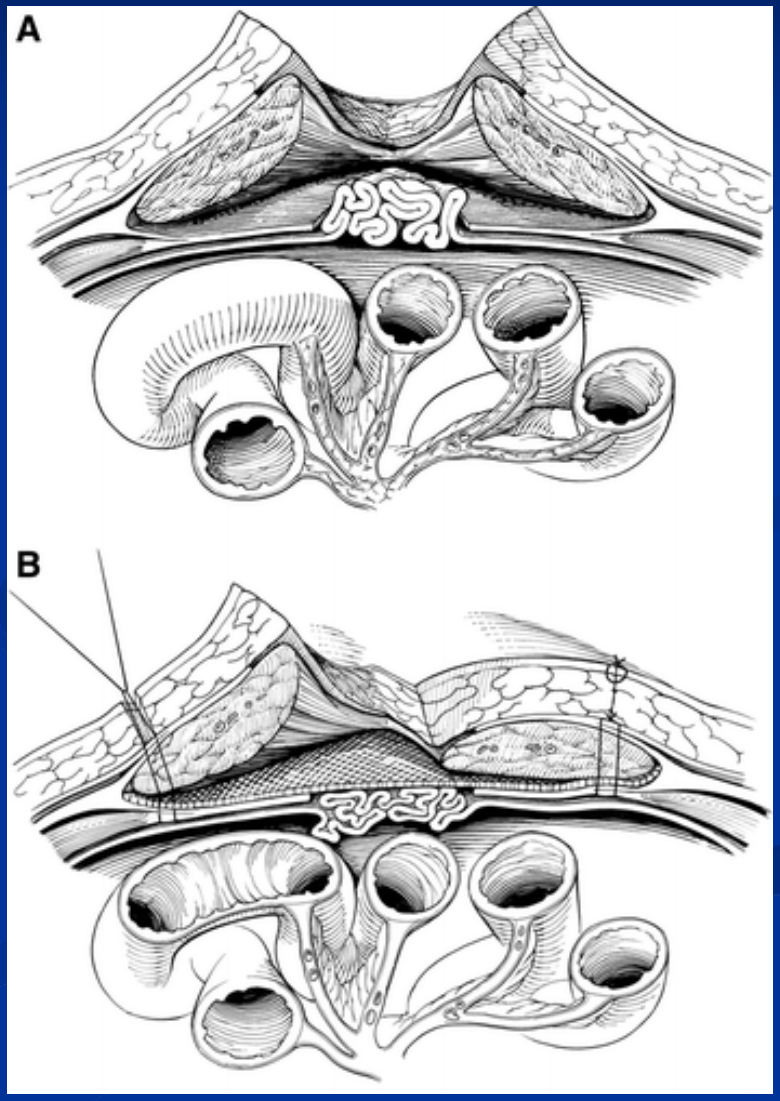
Dr. Rene Stoppa

1921-2006

Open Repair-The Gold Standard

Rives-Stoppa technique

- **placement wide mesh**
- **retro-rectus or preperitoneal plane**
- **secure with transfascial fixation sutures**



Outcome of Retro-muscular Open Repair

Author	Year	#	Wound complication %	Mortality %	Follow-up	Recurrence %
Stoppa	1989	368	12	1.8	5.5 y	14.6
Rives	1992	258	7.7	0.8	–	6.2
Wantz	1991	30	0	0	–	0
McLanahan	1997	106	18	–	2 y	3.5
Schumpelick	1999	81	–	–	22 mo	5
Martin-Duce	2001	152	11	0	6 y	1.3
Petersen	2004	175	8	0	20 mo	9
Kingsnorth	2004	33	–	–	6 mo–6 y	3.3
Paajanen	2004	84	6	0	3 y	5
Burger	2004	60	10	0	10 y	32
Israelsson	2006	228	–	–	12–24 mo	7.3
Novitsky	2006	32	12	–	3 y	2.8
Totals		**1607**	**9.3**	**0.3**		**7.5**

Jin J, Rosen MJ, Surg clin N Am, 2008

Modified Rives-Stoppa Repair

254 patients reviewed over 13 years

-30% had prior repair

-33% were morbidly obese (BMI>35)

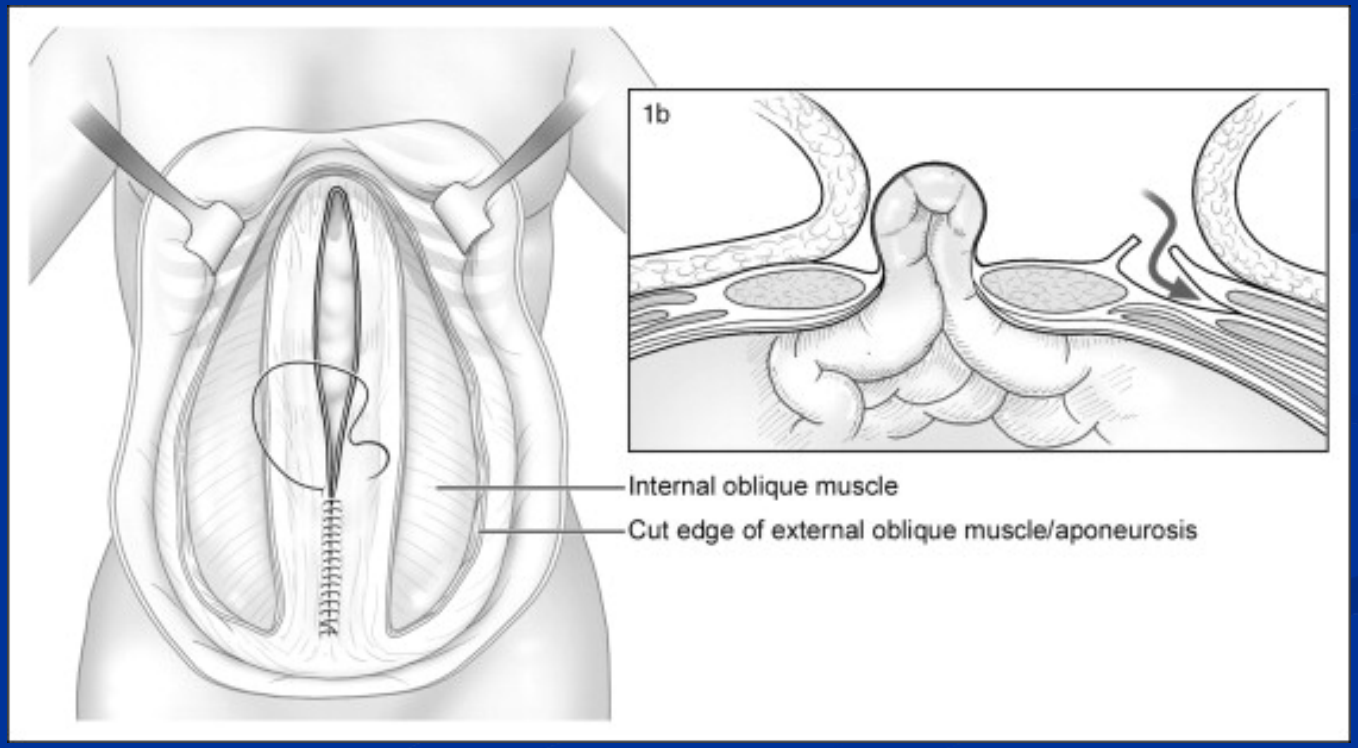
-31% had 'swiss-cheese' fascial defect

→Recurrence rate **5%**

Iqbal CW, et al. World J Surg 2007

Component Separation

- Fascial release to create tension-free repair
- Can use mesh reinforcement



Prospective Randomized Trial

162 patients with ventral incisional hernias

- 73 open vs 73 laparoscopic
- Fewer serious complications in open group
- Fewer infections and seromas in laparoscopic group
- Hospital LOS and recurrence rate were the same

Itani, KM, et al, Arch Surg 2010

Table 2. Postoperative Complications (Primary and Secondary Outcomes)

	Patients, No. (%)		
	Laparoscopic Repair (n=73)	Open Repair (n=73)	*P* Value[a]
Primary outcome			
Overall complications through 8 wk	23 (31.5)	35 (47.9)	.03
Intraoperative complications			
Injury to bowel	3 (4.1)	0	
Problems related to anesthesia	1 (1.4)	0	
Other	3 (4.1)	1 (1.4)	
Overall	7 (9.6)	1 (1.4)	.046
Short-term postoperative complications	(n=72)	(n=73)	
Hernia site infection	2 (2.8)	16 (21.9)	
Wound hematoma	2 (2.8)	2 (2.7)	
Bleeding	1 (1.4)	1 (1.4)	
Intra-abdominal abscess	2 (2.8)	2 (2.7)	
Ileus/bowel obstruction	3 (4.2)	2 (2.7)	
Seroma	6 (8.3)	18 (24.7)	
Skin necrosis	2 (2.8)	3 (4.1)	
Other	10 (13.9)	5 (6.8)	
Overall	15 (20.8)	33 (45.2)	.001
Serious complications within 30 d	(n=68)	(n=72)	
Sepsis	2 (2.9)	0	
Urinary tract infection	1 (1.5)	0	
Other	1 (1.5)	1 (1.4)	
Overall	3 (4.4)	1 (1.4)	.25
Long-term (8 wk) postoperative complications	(n=69)	(n=70)	
Hernia site infection	1 (1.5)	1 (1.4)	
Wound hematoma	0	0	
Intra-abdominal abscess	1 (1.5)	0	
Ileus/bowel obstruction	1 (1.5)	0	
Seroma	0	0	
Skin necrosis	0	0	
Other	1 (1.5)	1 (1.4)	
Overall	3 (4.4)	2 (2.9)	.69

Laparoscopic Repair

Survey of 207 practicing US Surgeons

- 10% perform laparoscopic ventral hernia repairs
- 82% indicated they did not desire to learn the technique

→cited increased risk of enterotomy, higher cost, and longer operating time

Alder AC, et al, Am J Surg 2007

Laparoscopic Repair

- Anatomical Shortcomings
  - Inability to restore functional abdominal wall anatomy
  - Skin redundancy
  - Management of hernia sac
- Practical Shortcomings
  - Technically difficult
  - Cost

Meta-analysis

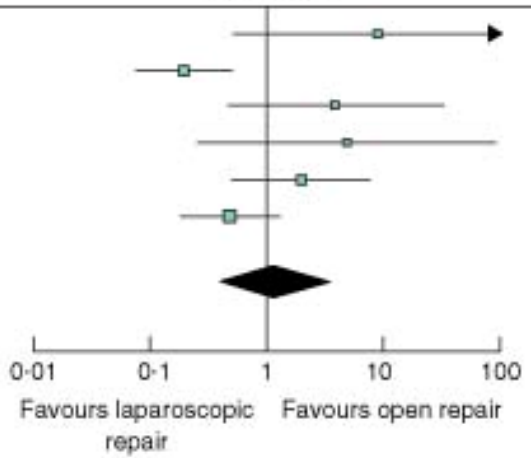
- 1950-2009
- 8 randomized trials
- 264 laparoscopic vs. 253 open

Forbes SS, et al. Br J Surg 2009

Seroma formation

Reference	Laparoscopic	Open	Weight (%)	Relative risk
Barbaros *et al.*[14]	4 of 23	0 of 23	10·4	9·00 (0·51, 158·17)
Carbajo *et al.*[15]	4 of 30	20 of 30	22·8	0·20 (0·08, 0·52)
Misra *et al.*[16]	4 of 33	1 of 33	14·3	4·00 (0·47, 33·91)
Navarra *et al.*[18]	2 of 12	0 of 12	10·1	5·00 (0·27, 94·34)
Olmi *et al.*[19]	6 of 85	3 of 85	19·8	2·00 (0·52, 7·74)
Pring *et al.*[20]	5 of 30	8 of 24	22·6	0·50 (0·19, 1·33)
Total	25 of 213	32 of 207	100·0	1·22 (0·38, 3·99)

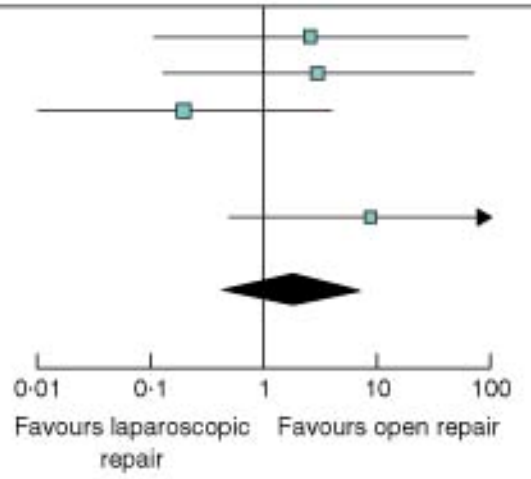
Heterogeneity: $\tau^2 = 1{\cdot}36$; $\chi^2 = 17{\cdot}01$, 5 d.f., $P = 0{\cdot}004$; $I^2 = 71\%$
Test for overall effect: $Z = 0{\cdot}33$, $P = 0{\cdot}74$



Bowel injury

Reference	Laparoscopic	Open	Weight (%)	Relative risk
Asencio *et al.*[13]	1 of 45	0 of 39	23·3	2·61 (0·11, 62·26)
Barbaros *et al.*[14]	1 of 23	0 of 23	23·6	3·00 (0·13, 70·02)
Carbajo *et al.*[15]	0 of 30	2 of 30	25·8	0·20 (0·01, 4·00)
Misra *et al.*[16]	0 of 33	0 of 33		Not estimable
Navarra *et al.*[18]	0 of 12	0 of 12		Not estimable
Olmi *et al.*[19]	4 of 85	0 of 85	27·2	9·00 (0·49, 164·62)
Total	6 of 228	2 of 222	100·0	1·95 (0·38, 9·85)

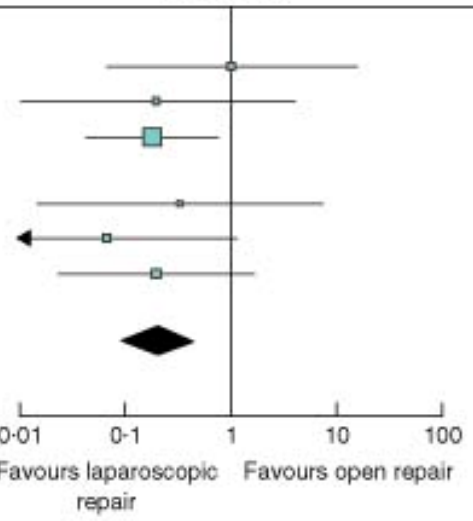
Heterogeneity: $\tau^2 = 0{\cdot}31$; $\chi^2 = 3{\cdot}39$, 3 d.f., $P = 0{\cdot}34$; $I^2 = 11\%$
Test for overall effect: $Z = 0{\cdot}80$, $P = 0{\cdot}42$



Wound infection without mesh removal

Reference	Laparoscopic	Open	Weight (%)	Relative risk
Asencio *et al.*[13]	0 of 45	0 of 39		Not estimable
Barbaros *et al.*[14]	1 of 23	1 of 23	11·5	1·00 (0·07, 15·04)
Carbajo *et al.*[15]	0 of 30	2 of 30	9·4	0·20 (0·01, 4·00)
Misra *et al.*[16]	2 of 33	11 of 33	41·4	0·18 (0·04, 0·76)
Moreno-Egea *et al.*[17]	0 of 11	0 of 11		Not estimable
Navarra *et al.*[18]	0 of 12	1 of 12	8·7	0·33 (0·01, 7·45)
Olmi *et al.*[19]	0 of 85	7 of 85	10·4	0·07 (0·00, 1·15)
Pring *et al.*[20]	1 of 30	4 of 24	18·7	0·20 (0·02, 1·67)
Total	4 of 269	26 of 257	100·0	0·22 (0·09, 0·54)

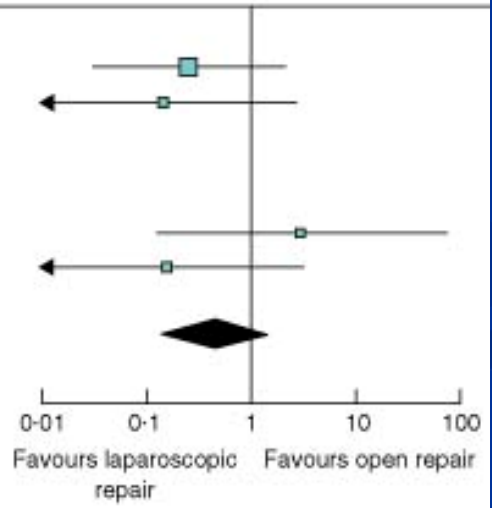
Heterogeneity: $\tau^2 = 0{\cdot}00$; $\chi^2 = 2{\cdot}08$, 5 d.f., $P = 0{\cdot}84$; $I^2 = 0\%$
Test for overall effect: $Z = 3{\cdot}28$, $P = 0{\cdot}001$



Infection requiring mesh removal

Reference	Laparoscopic	Open	Weight (%)	Relative risk
Asencio *et al.*[13]	0 of 45	0 of 39		Not estimable
Barbaros *et al.*[14]	1 of 23	4 of 23	40·6	0·25 (0·03, 2·07)
Carbajo *et al.*[15]	0 of 30	3 of 30	21·3	0·14 (0·01, 2·65)
Misra *et al.*[16]	0 of 33	0 of 33		Not estimable
Moreno-Egea *et al.*[17]	0 of 11	0 of 11		Not estimable
Navarra *et al.*[18]	0 of 12	0 of 12		Not estimable
Olmi *et al.*[19]	1 of 85	0 of 85	17·9	3·00 (0·12, 72·62)
Pring *et al.*[20]	0 of 30	2 of 24	20·3	0·16 (0·01, 3·21)
Total	2 of 269	9 of 257	100·0	0·32 (0·08, 1·22)

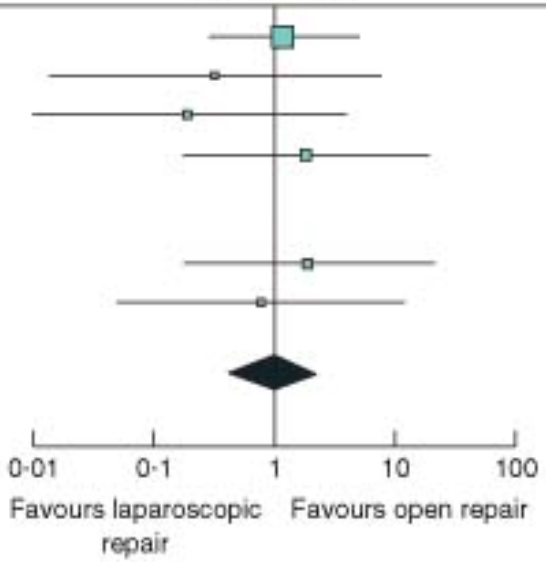
Heterogeneity: $\tau^2 = 0{\cdot}00$; $\chi^2 = 2{\cdot}44$, 3 d.f., $P = 0{\cdot}49$; $I^2 = 0\%$
Test for overall effect: $Z = 1{\cdot}67$, $P = 0{\cdot}09$



Hernia Recurrence

Reference	Hernia recurrence: Laparoscopic	Hernia recurrence: Open	Weight (%)	Relative risk
Asencio *et al.*[13]	4 of 41	3 of 38	40·9	1·24 (0·30, 5·17)
Barbaros *et al.*[14]	0 of 23	1 of 23	8·4	0·33 (0·01, 7·78)
Carbajo *et al.*[15]	0 of 30	2 of 30	9·3	0·20 (0·01, 4·00)
Misra *et al.*[16]	2 of 32	1 of 30	15·2	1·88 (0·18, 19·63)
Moreno-Egea *et al.*[17]	0 of 11	0 of 11		Not estimable
Navarra *et al.*[18]	0 of 12	0 of 12		Not estimable
Olmi *et al.*[19]	2 of 85	1 of 85	14·8	2·00 (0·18, 21·64)
Pring *et al.*[20]	1 of 30	1 of 24	11·3	0·80 (0·05, 12·14)
Total	9 of 264	9 of 253	100·0	1·02 (0·41, 2·54)

Heterogeneity: $\tau^2 = 0{\cdot}00$; $\chi^2 = 2{\cdot}31$, 5 d.f., $P = 0{\cdot}80$; $I^2 = 0\%$
Test for overall effect: $Z = 0{\cdot}03$, $P = 0{\cdot}97$



Cost Analysis

- 66 patients randomized laparoscopic vs. open inguinal hernia repair
- Patients and surgeons blinded to operative technique
- Open was **$1200** cheaper than laparoscopic repair

Butler RE, et al. Surg Endosc 2007

Conclusions

→Open repair remains the gold standard

→Equivalent recurrence rates

→Long-term outcomes need to be measured with a large, multicenter, randomized controlled trial

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Thank You