Cutting Through Reflux:
Surgical Options and Outcomes

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Joint Providership

ASGE
American Society for Gastrointestinal Endoscopy

Disclosures:
Medtronic- Investigator initiated research grant

I am a surgeon

Objectives:

As a result of this presentation, providers will be able to:

1) *Describe options for antireflux surgery*
2) *Compare relative efficacy and side effect profile*

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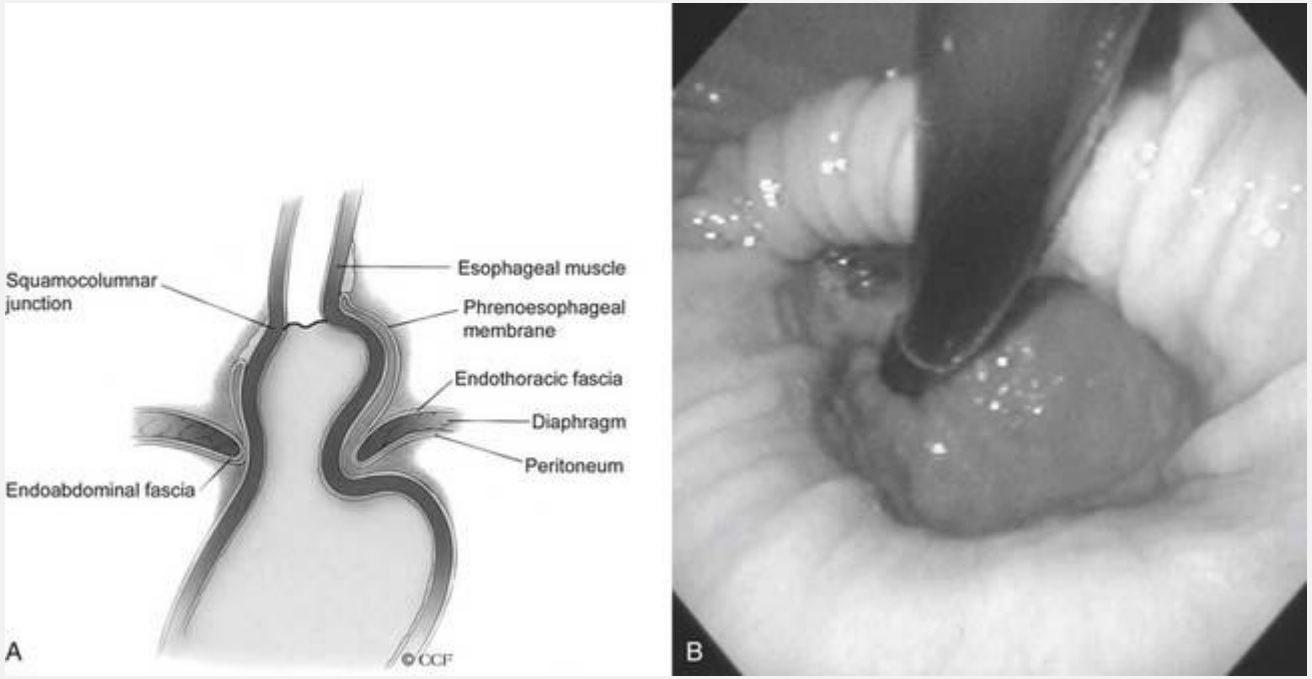
HIATAL HERNIA TYPES

- Type 1- sliding hiatal hernia
- Paraesophageal hernias: types 2-4



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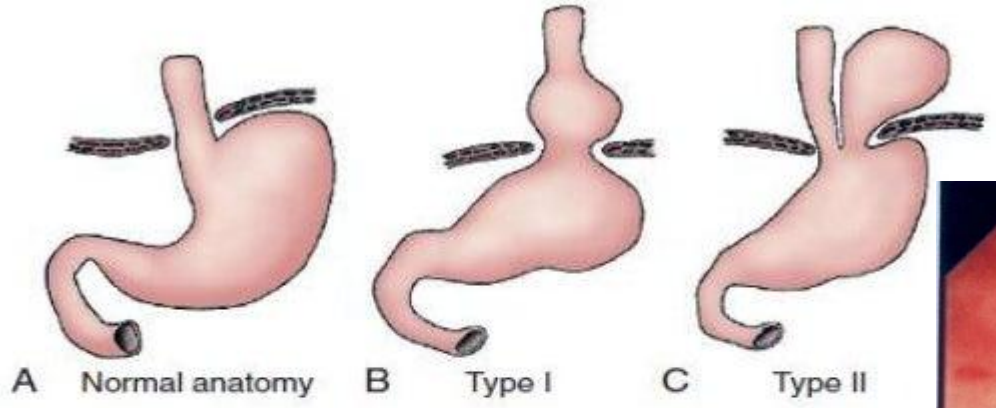
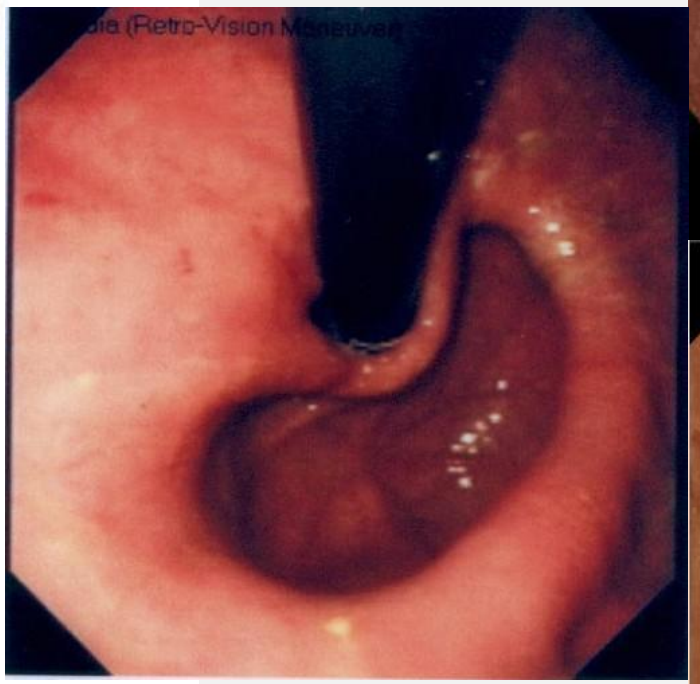
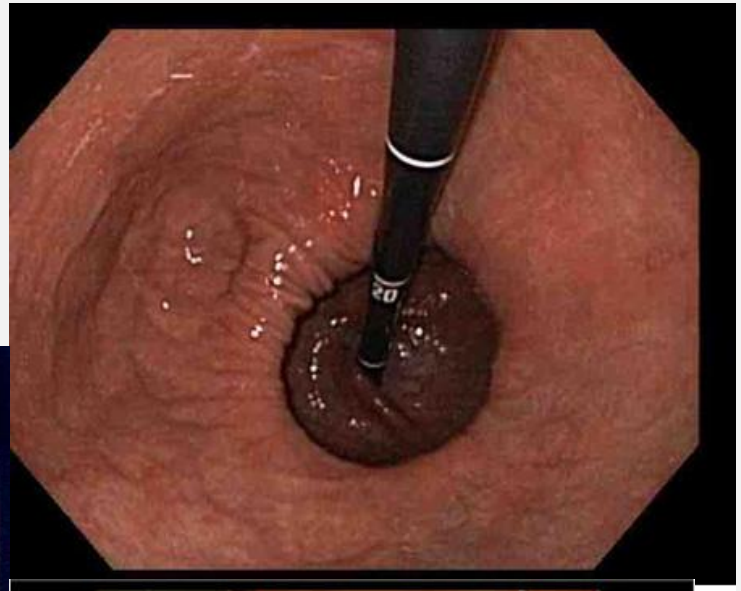
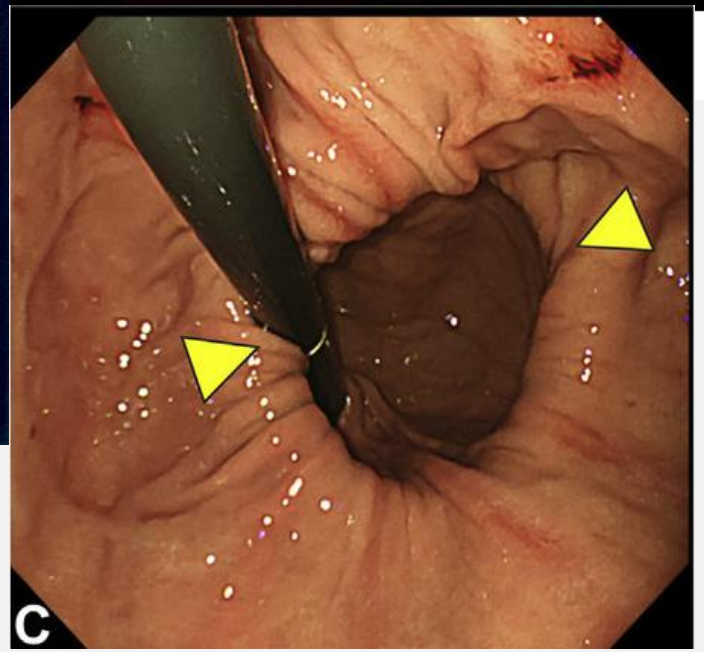
HIATAL HERNIA TYPES









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AFS GRADE

The American Foregut Society White Paper on the Endoscopic Classification of Esophagogastric Junction Integrity

Foregut
1–10

DOI: 10.1177/26345161221126961
journals.sagepub.com/home/gut
SAGE

Ninh T. Nguyen[1], Nirav C. Thosani[2], Marcia Irene Canto[3], Kenneth Chang[4], John Lipham[5], Barham Abu Dayyeh[6], Erik B. Wilson[7], V. Raman Muthusamy[8], John Clarke[9], Reginald Bell[10], Peter Janu[11], Lee Swanstrom[12], Ava Runge[1], and Peter J. Kahrilas[13]

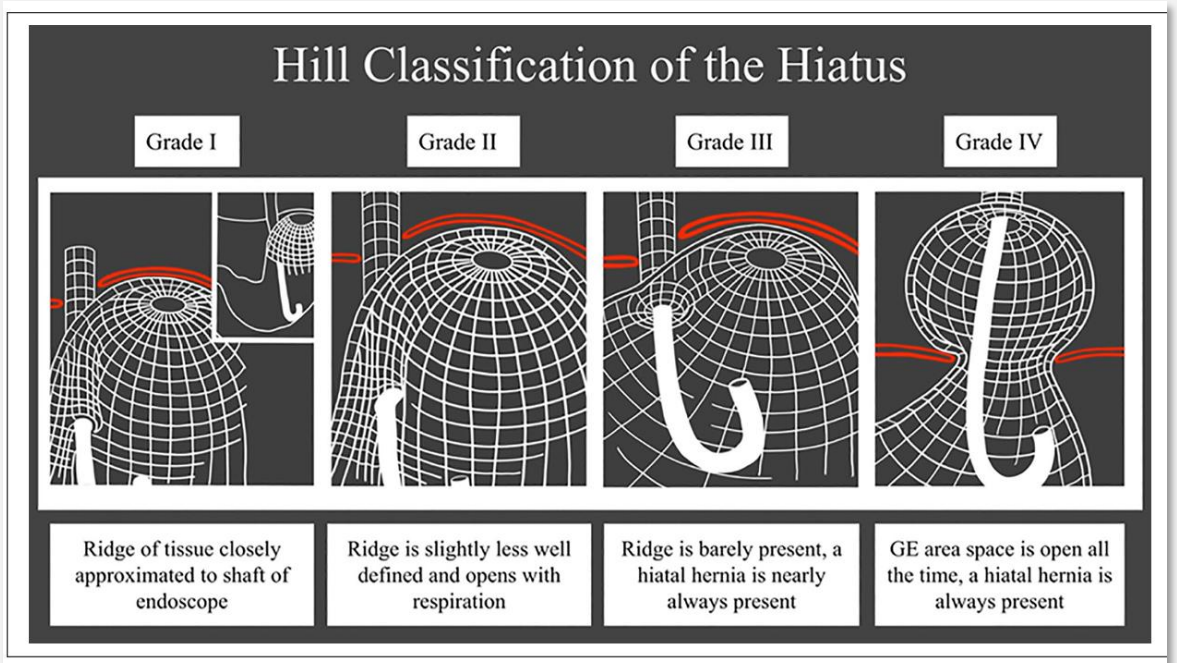
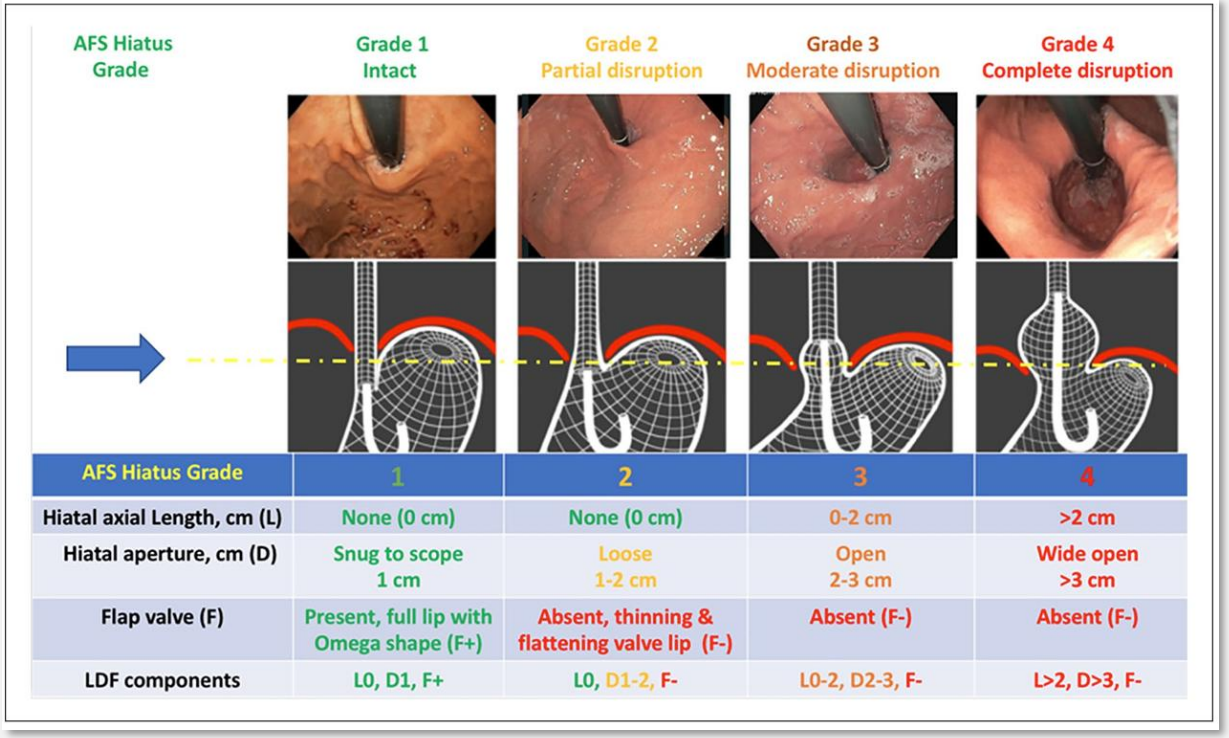


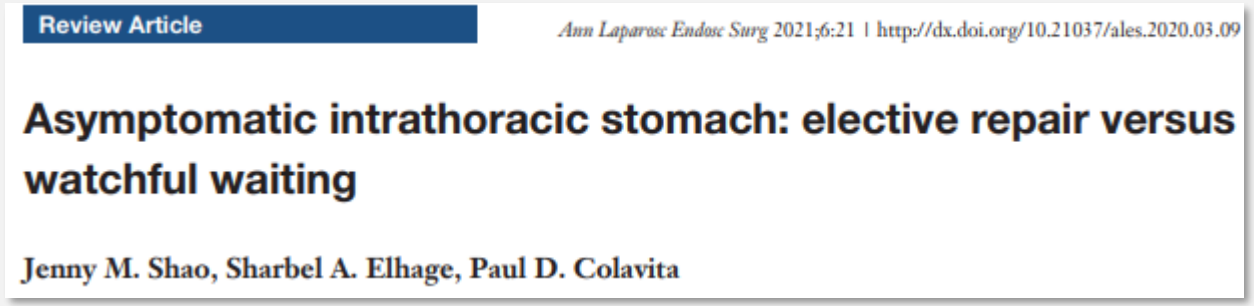
Figure 1. The original schematic description of the Hill classification of the hiatus with grade I and II being a normal flap valve while grade III and IV represent valves associated with reflux.

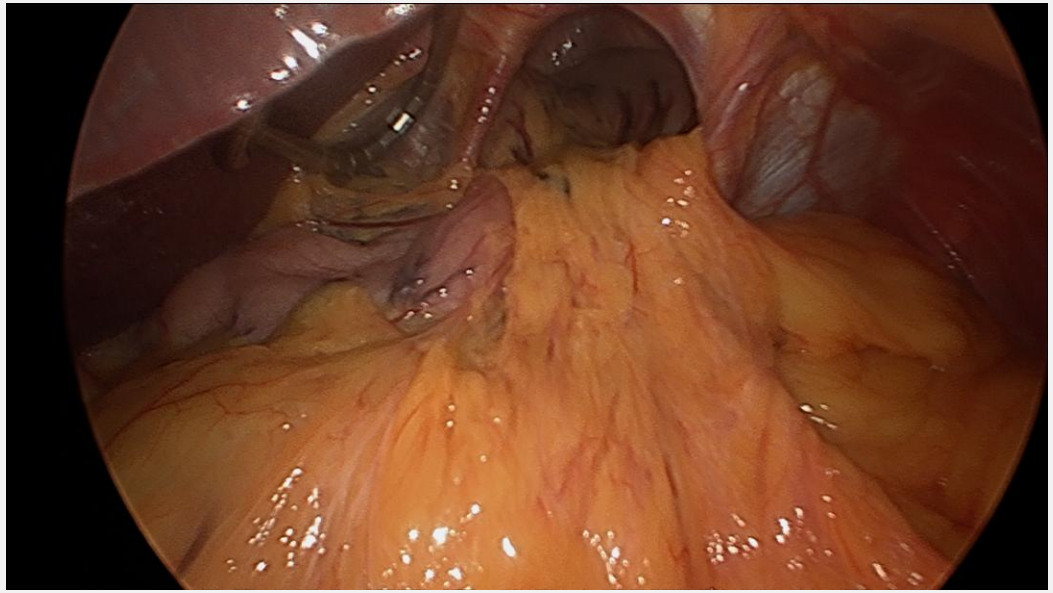


AFS Hiatus Grade	1	2	3	4
Hiatal axial Length, cm (L)	None (0 cm)	None (0 cm)	0-2 cm	>2 cm
Hiatal aperture, cm (D)	Snug to scope 1 cm	Loose 1-2 cm	Open 2-3 cm	Wide open >3 cm
Flap valve (F)	Present, full lip with Omega shape (F+)	Absent, thinning & flattening valve lip (F-)	Absent (F-)	Absent (F-)
LDF components	L0, D1, F+	L0, D1-2, F-	L0-2, D2-3, F-	L>2, D>3, F-

PARAESOPHAGEAL HERNIA

- Perioperative morbidity for elective repair is low
- Recurrence rates are high
  - >50% in some series
  - Absorbable or biologic mesh reinforcement only helps in the short term
- Recurrences can be asymptomatic, but can also be worse than the symptoms prior to the first repair
- Which patients benefit from surgery?
- When is watchful waiting appropriate?





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WATCHFUL WAITING

- Markov Monte Carlo models
  - Type 2 and 3 paraesophageal hernias
  - Age>65
  - Asymptomatic
    - Anemia = symptom
- Initial publication 2002
  - No gain in Quality Adjusted Life Years (QALY) for elective asymptomatic repair
  - Surgery reduced QALY by 0.13
  - Overall risk of requiring emergency surgery: 1.16% per year
- Reinforced in 2018 with updated data (Jung et al, *Surg Endosc*)


ANNALS OF SURGERY
Vol. 236, No. 4, 492–501

Paraesophageal Hernias: Operation or Observation?

Nicholas Stylopoulos, MD,* G. Scott Gazelle, MD, MPH, PhD,*†‡ and David W. Rattner, MD*†

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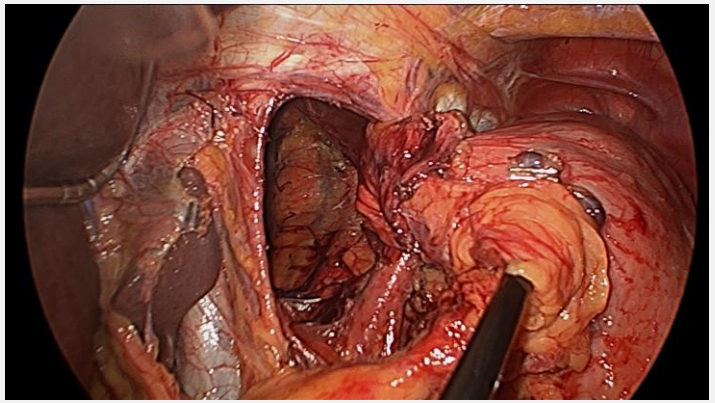
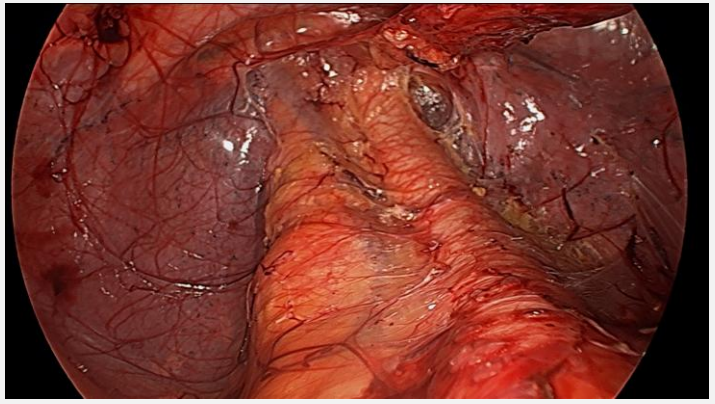
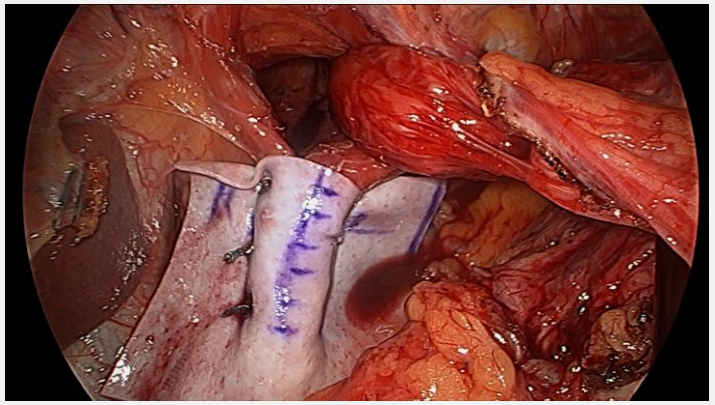
SURGERY

- Common rationale for surgery for asymptomatic patients:
  - Mortality 6-7x increase with emergent versus elective
  - Older NIS data: up to 16% versus 2.5% mortality
    - Poulouse et al *J Gastrointest Surg 2008*
  - More recent NIS data
    - Controlling for confounding factors
    - Emergency status was not independently associated with mortality (frailty and sepsis)
    - Augustin et al *J Gastrointest Surg* 2015
- Symptomatic patients- more straightforward
  - Improved quality of life through 3 years- Lidor et al *JAMA Surg* 2015
  - 90% of patients with "good" to "excellent" quality of life- Luketich et al *J Thorac Cardiovasc* 2010







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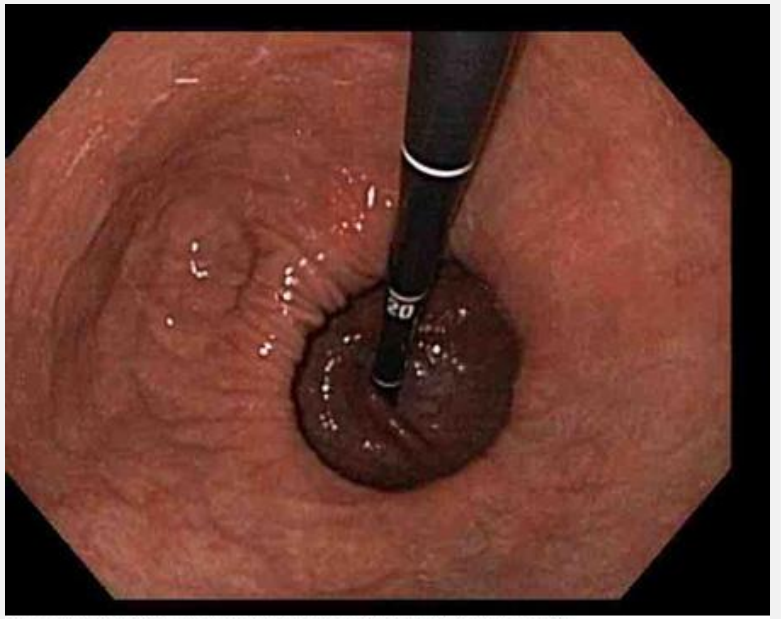
TYPE I HIATAL HERNIA

- Typically only need surgery for abnormal acid exposure or laryngopharyngeal reflux
  - LA Grade B/C/D esophagitis
  - Barrett's
  - pH testing
- Indications for antireflux surgery
  - Incomplete response to medical therapy
  - Desire for an alternative to medical therapy
  - Progression of disease on medical therapy



Source: McPhee SJ, Papadakis MA: *Current Medical Diagnosis and Treatment 2012*, 51st Edition: www.accessmedicine.com

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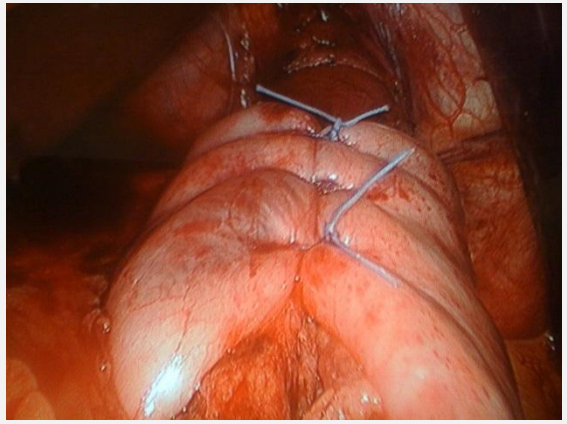
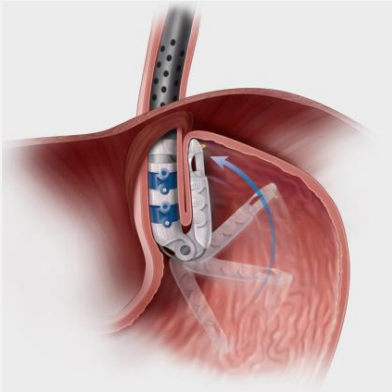
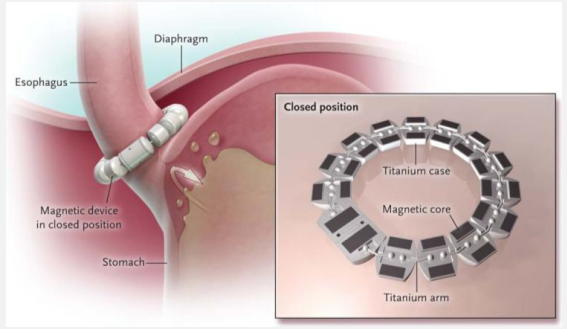
ANTIREFLUX SURGERY

- Restore the Reflux Barrier
- Avoid Side Effects

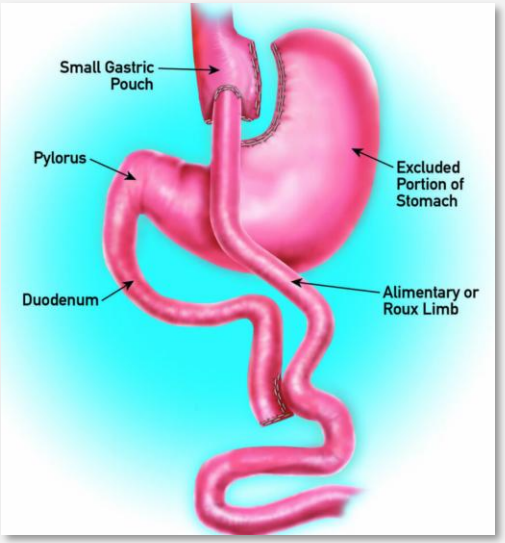




- Fundoplication
  - Complete and partial
- Magnetic Sphincter Augmentation
- Transoral Incisionless Fundoplication
- Stretta- RFA treatment



- For BMI >35 – consider gastric bypass
  - Diversion of acid, no impact on reflux barrier



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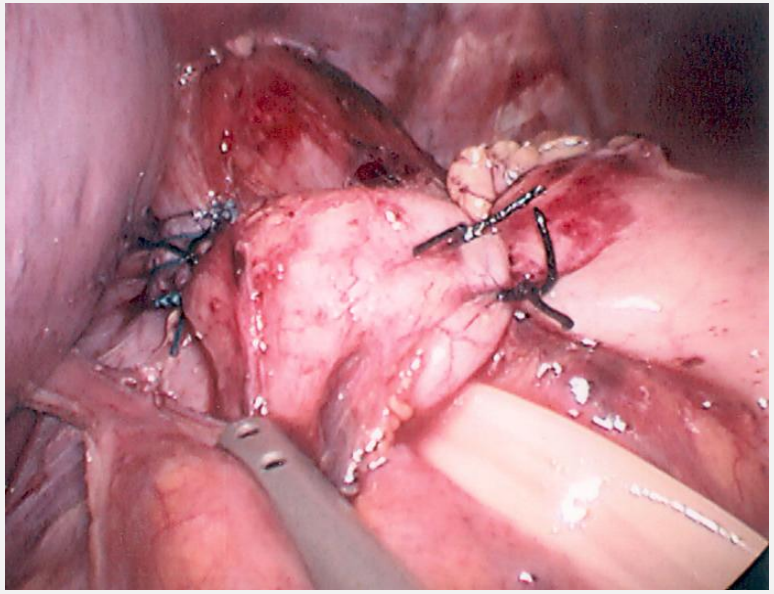
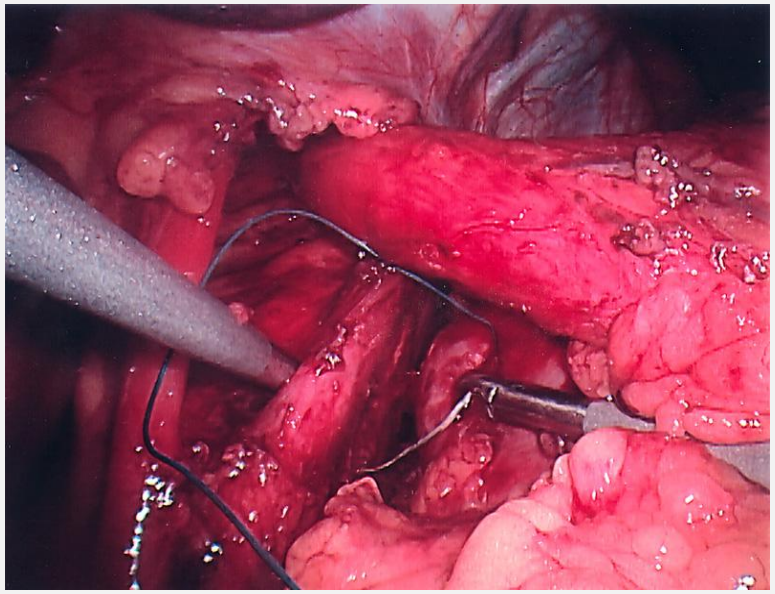
ANTIREFLUX SURGERY

- "Gastroplication"
  - Rudolph Nissen – 1956
- Other pioneers
  - Philip Allison
  - Norman Barrett
  - Ronald Belsey
  - J. Leigh Collis
  - Lucius Hill





1. Nissen R. [A simple operation for control of reflux esophagitis]. Schweiz Med Wochenschr 1956;86:590-2.
2. Stylopoulos N, Rattner DW. The history of hiatal hernia surgery: from Bowditch to laparoscopy. Ann Surg 2005; 241(1):185-193.

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ANTIREFLUX SURGERY

- Laparoscopic Nissen Fundoplication
  - Bernard Dallemagne – 1991
- Antireflux surgery- surged in 1990's
  - Peak- 1999/2000
    - 32,000-33,000 US cases
  - Steady decline through 2006

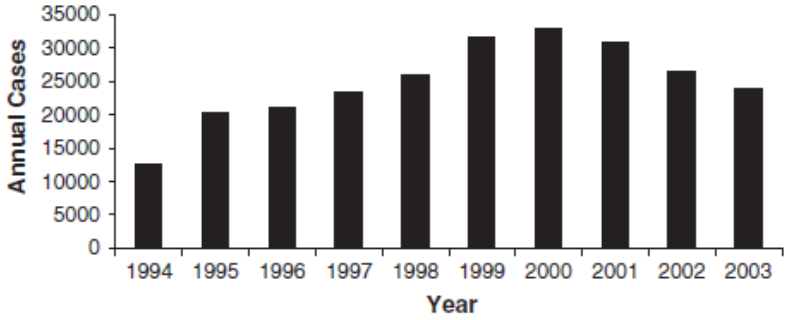

Fig. 1. Annual number of antireflux surgery procedures performed in the United States, based on data from the Nationwide Inpatient Sample, 1994 to 2003.

Surg Endosc (2006) 20: 1698–1701

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FUNDOPLICATION

- The Gold Standard for Antireflux Surgery
  - Has gotten a bit of a bad reputation
  - Side effects: bloating/dysphagia
- Vakil N et al, Am J Med 2003
  - 80 lap Nissen patients
  - 20month fu
  - 32% resumed acid suppression
  - 67% with new symptoms
    - 47% excessive gas
    - 26% bloating
    - 27% dysphagia
  - Only 61% completely satisfied

New Symptoms

Time Since Surgery	Dysphagia	Bloating	Excessive Gas
	Number (%)		
≤6 months	6 (7)	3 (4)	5 (6)
7 to 12 months	0	3 (4)	7 (9)
>12 months	16 (20)	16 (20)	26 (32)
Total	22 (27)	22 (26)	38 (47)

* Some patients had more than one symptom.

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FUNDOPLICATION

Five-Year Comprehensive Outcomes Evaluation in 181 Patients after Laparoscopic Nissen Fundoplication

Mehran Anvari, MB, BS, PhD, FRCSC, FACS, Christopher Allen, MA, BM, MRCP(UK), FRCP

- Another study from 2003

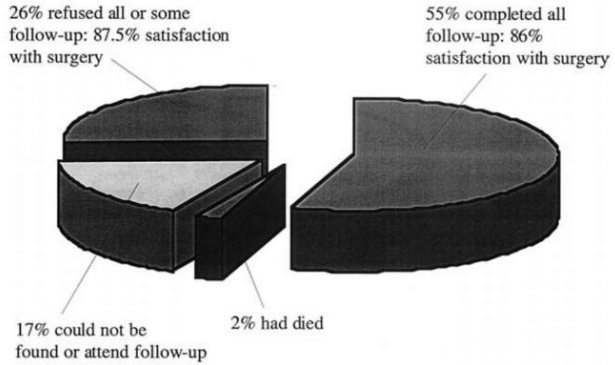

Figure 1. Five-year followup.

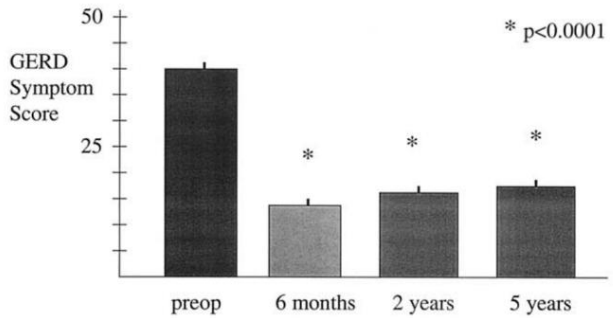

Figure 2. Gastroesophageal reflux symptom scores before and after surgery. GERD, gastroesophageal reflux disease; preop, preoperative.

Table 1. Lower Esophageal Pressure and Acid Reflux

Variables	Preoperation	6 mo	2 y	5 y
Lower esophageal sphincter pressure (mmHg)	7.16 ± 0.33	20.42 ± 0.66*	18.26 ± 0.78*	15.24 ± 0.97*†
Acid reflux (%)	8.43 ± 0.53	1.54 ± 0.22*	1.73 ± 0.40*	1.02 ± 0.26*

Values given as mean ± SE.
*$p < 0.0001$, as compared with preoperative values.
†$p < 0.05$, as compared with 6-month values.

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FUNDOPLICATION

Five-Year Comprehensive Outcomes Evaluation in 181 Patients after Laparoscopic Nissen Fundoplication

Mehran Anvari, MB, BS, PhD, FRCSC, FACS, Christopher Allen, MA, BM, MRCP(UK), FRCP

- 21 patients (12%) resumed antisecretory medication
- Only 9 (5%) had abnormal pH studies
  - 6 had reoperation
  - 2 well controlled with medication
  - 1 did not desire reoperation
- Dysphagia- 72% preop, 4.4% at 3 months
- Bloating- 71% preop, 57% at 6 months, 49% at 2 years, 42% at 5 years

ALL FUNDOPLICATIONS CREATED EQUAL?

Laparoscopic Toupet Fundoplication Is an Inadequate Procedure for Patients With Severe Reflux Disease

Karen D. Horvath, M.D., Blair A. Jobe, M.D., Daniel M. Herron, M.D., Lee L. Swanstrom, M.D.

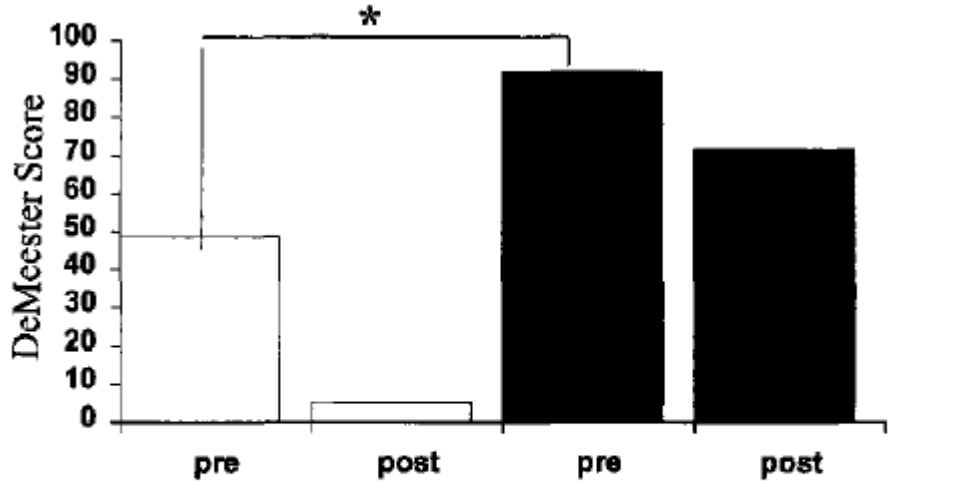

Fig. 6. Pre- and postoperative DeMeester scores.

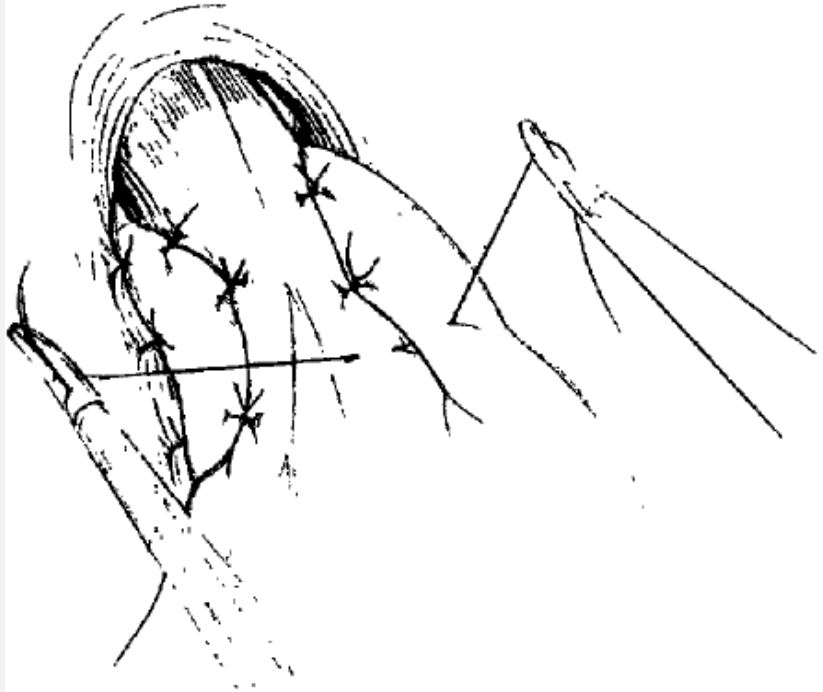

Fig. 1. Laparoscopic modified Toupet fundoplication.

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ALL FUNDOPLICATIONS CREATED EQUAL?

Comparison of results from a randomized trial 1 year after laparoscopic Nissen and Toupet fundoplications

Oliver O. Koch · Adolf Kaindlstorfer · Stavros A. Antoniou · Ruzica Rosalia Luketina · Klaus Emmanuel · Rudolph Pointner

Surg Endosc (2013) 27:2383–2390
DOI 10.1007/s00464-013-2803-0

Table 5 Reflux episodes detected by multichannel intraluminal impedance monitoring (MII) before the Nissen procedure and 1 year afterward

Reflux episodes	Total in 24 h		Acid in 24 h		Proximal in 24 h		Upright in 24 h		Recumbent in 24 h	
	Baseline	1 Year	Baseline	1 Year	Baseline	1 Year	Baseline	1 Year	Baseline	1 Year
Mean	96.60	20.58	72.24	12.78	62.32	9.58	160.8	28.43	36.19	14.33
SD	49.03	37.61	36.15	26.2	32.42	17.45	88.17	43.1	50.71	38.42
Minimum	25	0	11	0	14	0	40	0	0	0
Maximum	264	187	166	119	174	88	494	219	309	181
Percentile										
25th	65	1	46	0	41	0	112.8	1.25	11	0
Median	86	6.5	62	1	58.5	3.5	139	13	21.5	1
75th	106	19.75	92.75	12	75.25	8	178.3	43.5	39.25	9.75
95th	223.2	128.8	147.9	94.5	136.7	51.7	415	108.2	96.55	157
p Value	<0.001		<0.001		<0.001		<0.001		<0.001	

SD standard deviation

Table 4 Reflux episodes detected by multichannel intraluminal impedance monitoring (MII) before the Toupet procedure and 1 year afterward

Reflux episodes	Total in 24 h		Acid in 24 h		Proximal in 24 h		Upright in 24 h		Recumbent in 24 h	
	Base-line	1 Year	Baseline	1 Year	Baseline	1 Year	Base line	1 Year	Baseline	1 Year
Mean	101.54	21.42	74.75	12.08	64.43	11.39	168.3	34.11	35.59	10.87
SD	48.43	21.56	39.12	15.63	31.82	12.73	84.27	34.40	30.67	15.21
Minimum	10	0	2	0	5	0	16	0	0	0
Maxi mum	245	62	189	58	152	39	403	103	144	53
Percentile										
25th	71	4	46	1	40	1	116	4	12	0
Median	87	8	65	4	61	5.5	145	15	28	4
75th	125	40	99	21	85	18.25	196	68.25	58	17
95th	191.60	61.05	160.6	46.6	122.8	38.05	353.8	102.1	98.8	53
p Value	<0.001		<0.001		<0.001		<0.001		<0.001	

SD standard deviation

- Nissen versus Toupet
  - Equal improvement in quality of life
  - Toupet
    - Lower dysphagia rates
    - Lower in ability to belch
    - Lower reoperative rates

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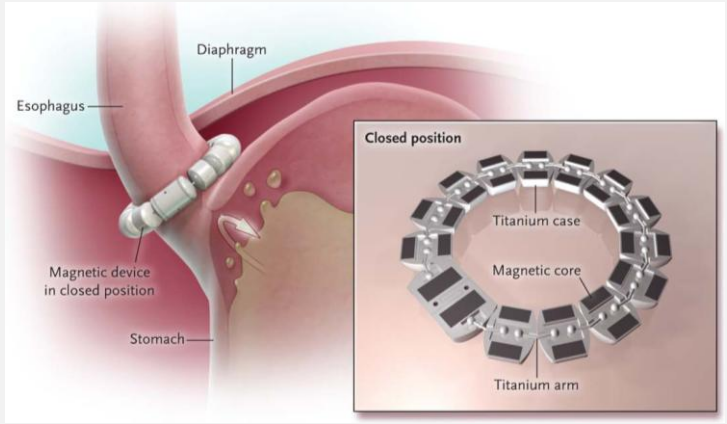
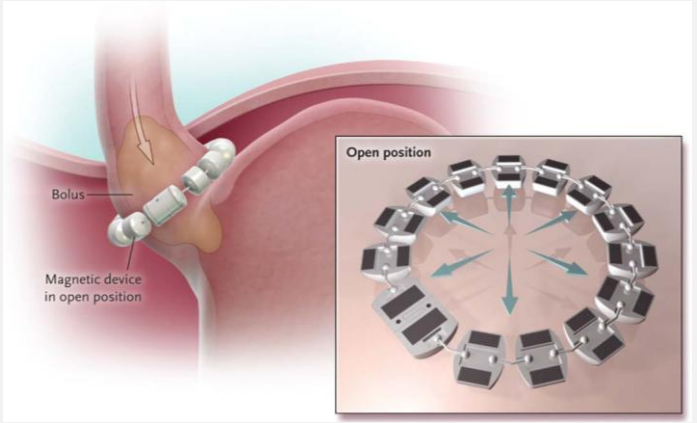
MAGNETIC SPHINCTER AUGMENTATION





The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Esophageal Sphincter Device for Gastroesophageal Reflux Disease

Robert A. Ganz, M.D., Jeffrey H. Peters, M.D., Santiago Horgan, M.D., Willem A. Bemelman, M.D., Ph.D., Christy M. Dunst, M.D., Steven A. Edmundowicz, M.D., John C. Lipham, M.D., James D. Luketich, M.D., W. Scott Melvin, M.D., Brant K. Oelschlager, M.D., Steven C. Schlack-Haerer, M.D., C. Daniel Smith, M.D., Christopher C. Smith, M.D., Dan Dunn, M.D., and Paul A. Taiganides, M.D.

N Engl J Med 2013; 368:719-727 | February 21, 2013 | DOI: 10.1056/NEJMoa1205544

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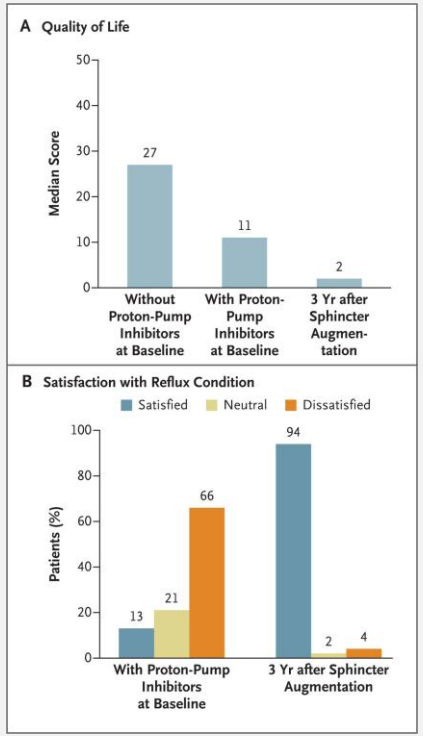

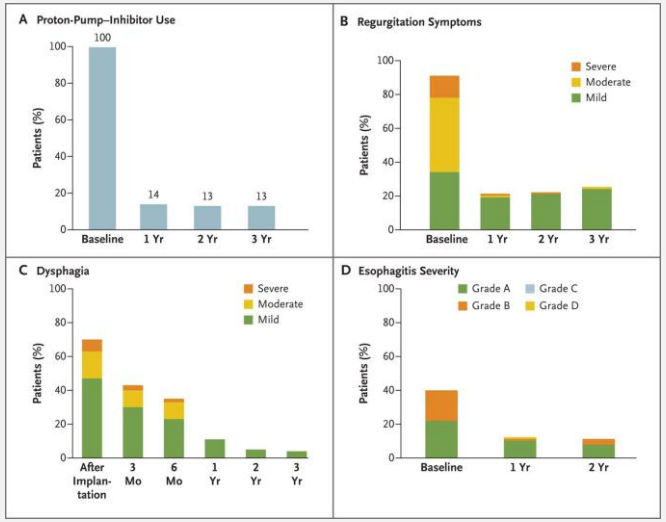

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MAGNETIC SPHINCTER AUGMENTATION

Long-Term Outcomes of Patients Receiving a Magnetic Sphincter Augmentation Device for Gastroesophageal Reflux

Robert A. Ganz,[*] Steven A. Edmundowicz,[‡] Paul A. Taiganides,[§] John C. Lipham,[‖] C. Daniel Smith,[¶] Kenneth R. DeVault,[#] Santiago Horgan,[**] Garth Jacobsen,[**] James D. Luketich,[‡‡] Christopher C. Smith,[§§] Steven C. Schlack-Haerer,[‖‖] Shanu N. Kothari,[¶¶] Christy M. Dunst,[##] Thomas J. Watson,[***] Jeffrey Peters,[‡‡‡] Brant K. Oelschlager,[§§§] Kyle A. Perry,[‖‖‖] Scott Melvin,[‖‖‖] Willem A. Bemelman,[¶¶¶] André J. P. M. Smout,[###] and Dan Dunn[****]

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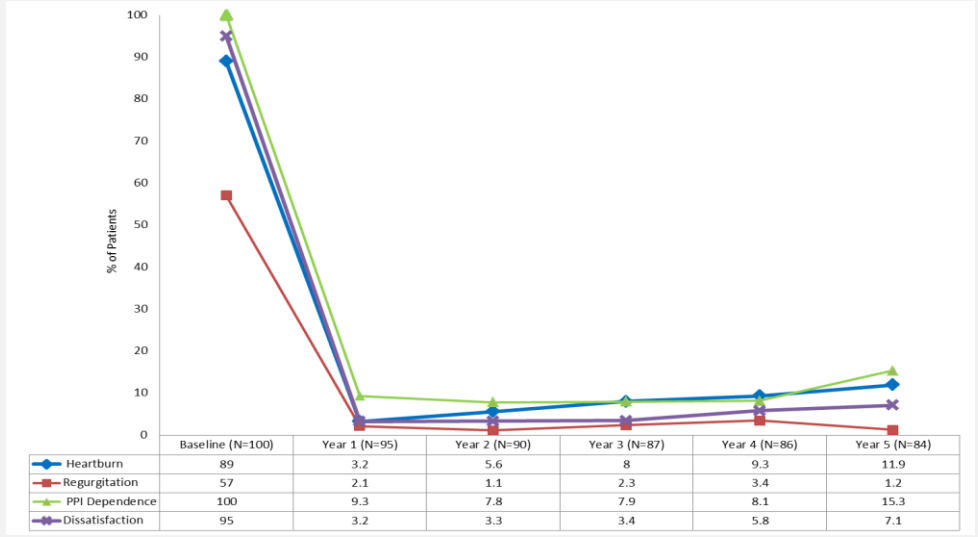
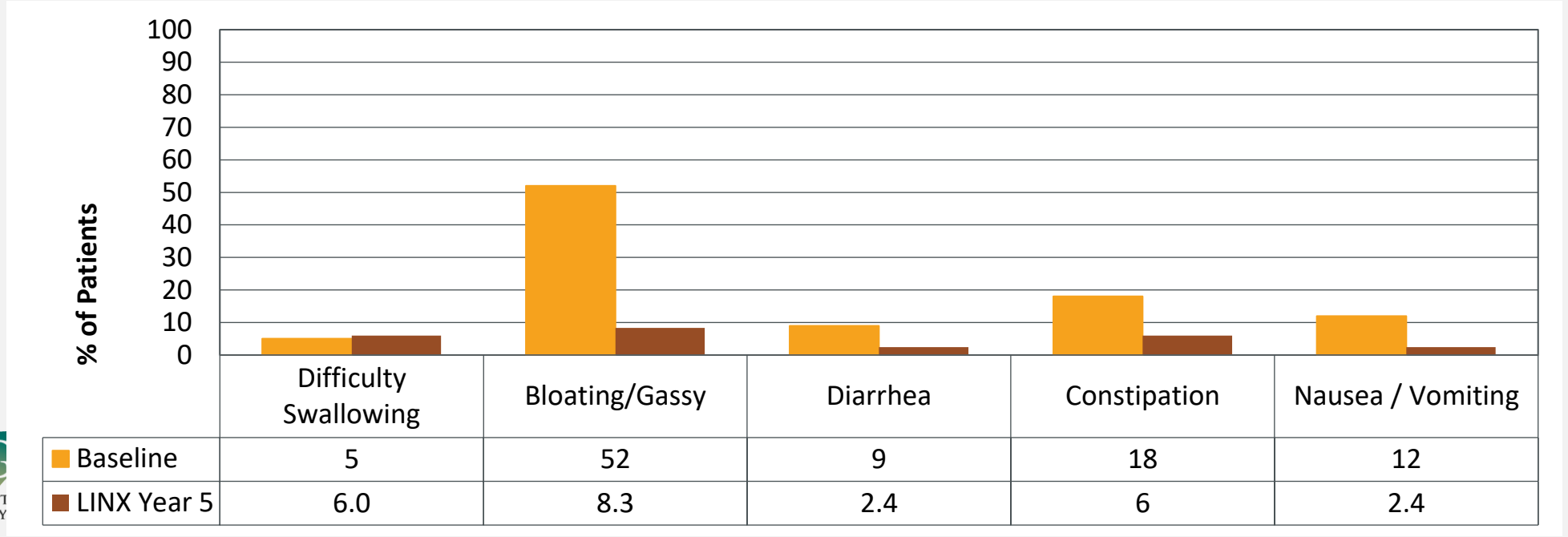


	Baseline (N=100)	Year 1 (N=95)	Year 2 (N=90)	Year 3 (N=87)	Year 4 (N=86)	Year 5 (N=84)
Heartburn	89	3.2	5.6	8	9.3	11.9
Regurgitation	57	2.1	1.1	2.3	3.4	1.2
PPI Dependence	100	9.3	7.8	7.9	8.1	15.3
Dissatisfaction	95	3.2	3.3	3.4	5.8	7.1



	Difficulty Swallowing	Bloating/Gassy	Diarrhea	Constipation	Nausea / Vomiting
Baseline	5	52	9	18	12
LINX Year 5	6.0	8.3	2.4	6	2.4

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MAGNETIC SPHINCTER AUGMENTATION

	Occurrence Rate
Device Removal	2.7%
Perioperative Complications	0.0%
Device Erosion	0.15%
Device Migration	0.0%
Device Malfunction	0.0%

Smith, C. Daniel, et. al.; Lower Esophageal Sphincter Augmentation for GERD: The Safety of a Modern Implant; Journal of Laparoendoscopic & Advanced Surgical Techniques (2017)

Short-Term Outcomes Using Magnetic Sphincter Augmentation Versus Nissen Fundoplication for Medically Resistant Gastroesophageal Reflux Disease

Brian E. Louie, MD, Alexander S. Farivar, MD, Dale Shultz, BS, Christina Brennan, CCRP, Eric Vallières, MD, and Ralph W. Aye, MD

Division of Thoracic Surgery, Swedish Cancer Institute and Medical Center, Seattle, Washington

	LINX	NISSEN
DeMeester Score (normal <14.7)	50→14	49→5
% time pH < 4 (normal <4.4%)	15→4.6%	14→1
normalization	56%	95%
Bloating HRQL*	1.3	2.4
Ability to belch	67%	0%

*NS

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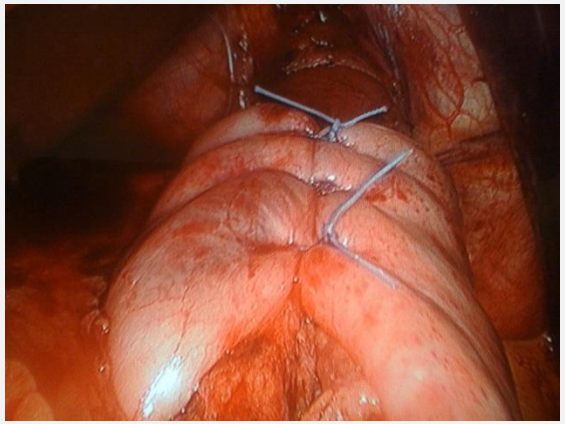
Randomized Controlled Trial



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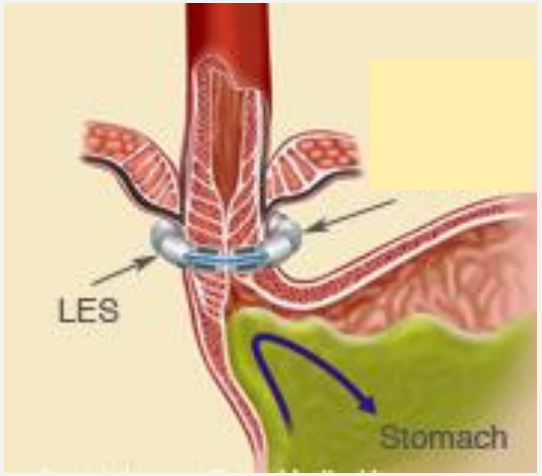
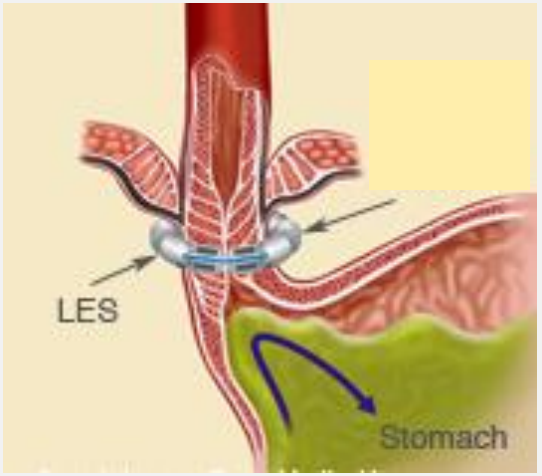


VS



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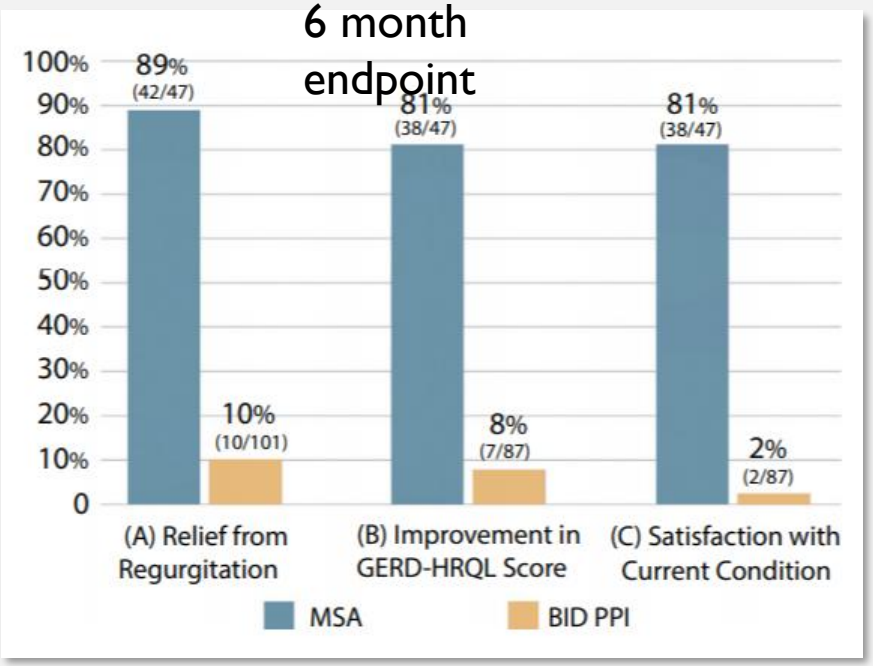
CALIBER TRIAL

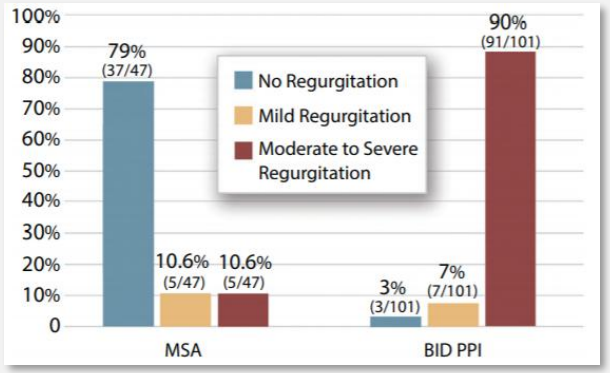
Laparoscopic magnetic sphincter augmentation versus double-dose proton pump inhibitors for management of moderate-to-severe regurgitation in GERD: a randomized controlled trial

Reginald Bell, MD,[1] John Lipham, MD,[2] Brian Louie, MD,[3] Valerie Williams, MD,[4] James Luketich, MD,[5] Michael Hill, MD,[6] William Richards, MD,[7] Christy Dunst, MD,[8] Dan Lister, MD,[9] Lauren McDowell-Jacobs, MD,[10] Patrick Reardon, MD,[11] Karen Woods, MD,[11] Jon Gould, MD,[12] F. Paul Buckley III, MD,[13] Shanu Kothari, MD,[14] Leena Khaitan, MD,[15] C. Daniel Smith, MD,[16] Adrian Park, MD,[17] Christopher Smith, MD,[18] Garth Jacobsen, MD,[19] Ghulam Abbas, MD,[20] Philip Katz, MD[21]

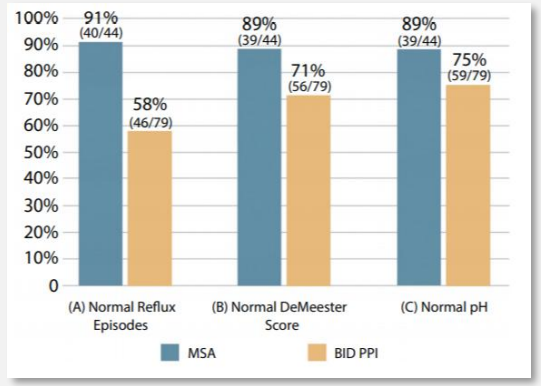
- Multicenter RCT, N=152
- BID PPI=102, MSA = 50
- 21 centers
- Moderate to severe regurgitation despite 8 weeks of once daily PPI
- BMI< 35, HH<3cm, abnormal pH testing, no Barrett's esophagus, no LA grade C or D esophagitis



- MSA arm- mean regurgitation score 4.2 → 1.6
  - 91% stopped PPI at 6 months
- BID PPI arm- mean regurgitation score 4.4→4.3



- MSA arm- 22.5 median reflux events
  - Mean DMS- 8
- BID PPI arm- median 49.0
  - Mean DMS- 18



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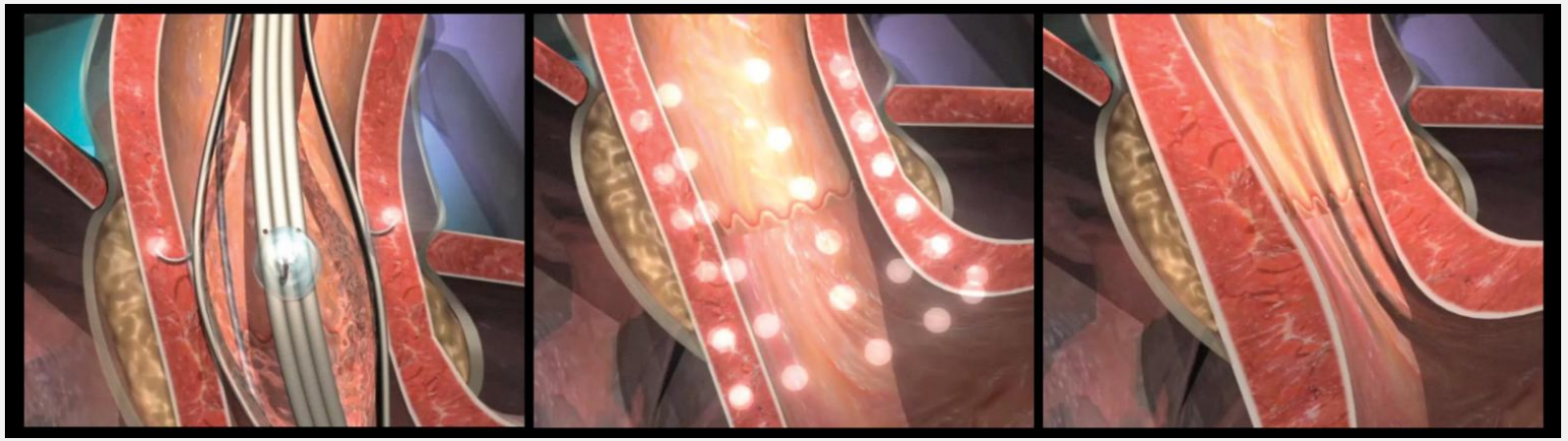
NON-ABLATIVE RADIOFREQUENCY THERAPY

Long-term maintenance effect of radiofrequency energy delivery for refractory GERD: a decade later

Mark Noar · Patrick Squires · Emmanuelle Noar · Martin Lee

Surg Endosc
DOI 10.1007/s00464-014-3461-6

- 10 year data
- 72% with normalization of GERD-HRQL scores
- 41% off PPI
  - 64% with >50% reduction



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META-ANALYSIS

Outcome Variable	Studies (n)	Patients (n)	Mean Follow-up (mo.)	Pre-Stretta	Post-Stretta	P-value
SUBJECTIVE MEASUREMENTS						
GERD-HRQL	9	433	19.8	26.11	9.25	0.0001
QOLRAD	4	250	25.2	3.30	9.25	0.0010
SF-36 Physical	6	299	9.5	36.45	46.12	0.0001
SF-36 Mental	5	264	10.0	46.79	55.16	0.0015
Heartburn Score	9	525	24.1	3.55	1.19	0.0001
Satisfaction Score	5	366	21.9	1..43	4.07	0.0006
OBJECTIVE MEASUREMENTS						
Esophageal Acid Exposure (%PH.<4)	11	364	11.9	10.29	6.51	0.0003
DeMeester score	7	267	13.1	44.37	28.53	0.0074
LES pressure	7	263	8.7	16.54	20.24	0.0302

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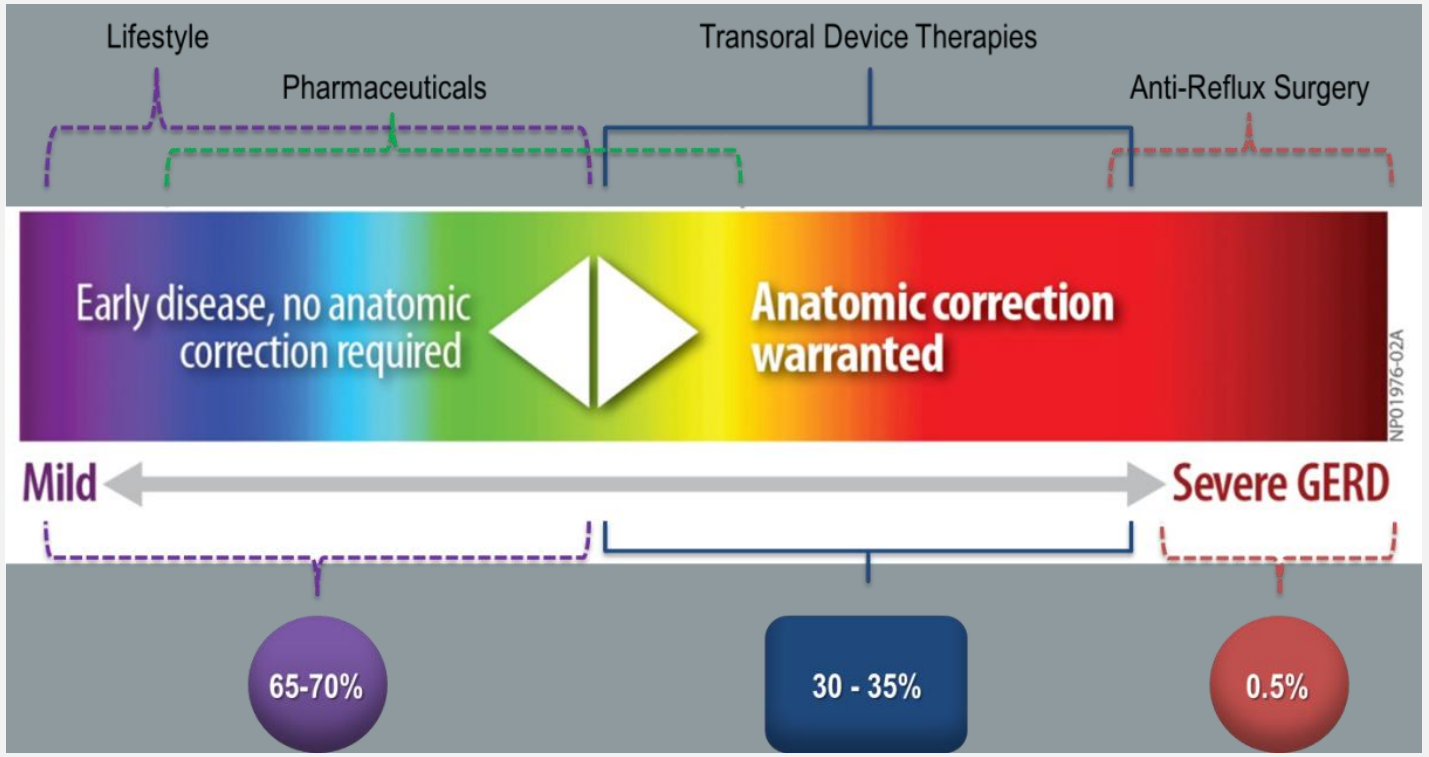
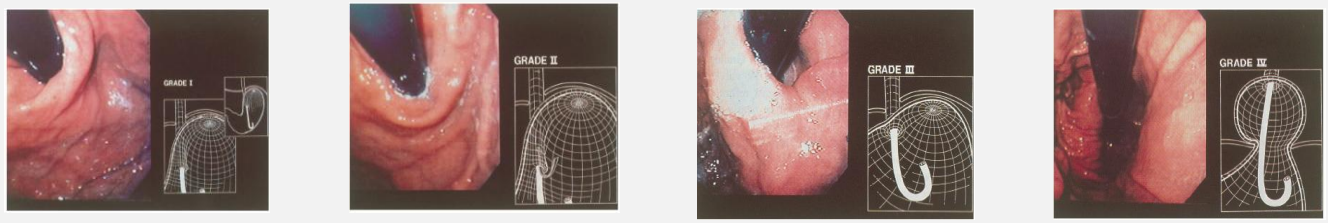
Radiofrequency Energy Delivery to the Lower Esophageal Sphincter Reduces Esophageal Acid Exposure and Improves GERD Symptoms: A Systematic Review and Meta-analysis. Kyle A. Perry, MD, Ambar Banerjee, MD, and William Scott Melvin, MD. *Surg Laparosc Endosc Percutan Tech* 2012;22:283–288

GERD Treatment Continuum





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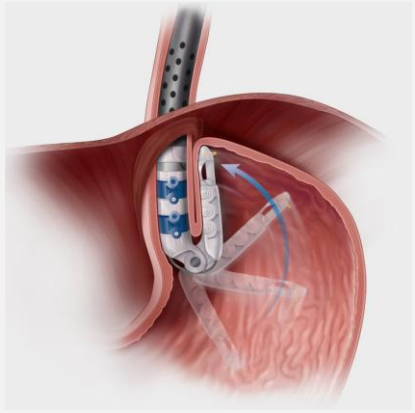
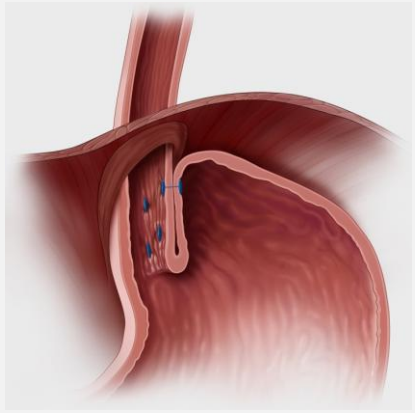
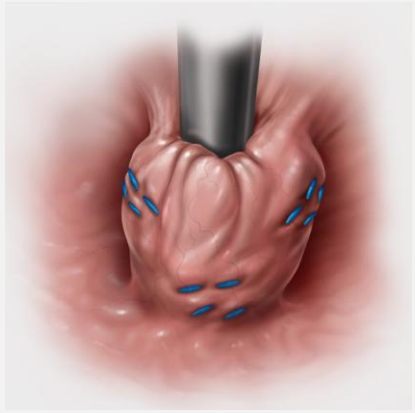
TRANSORAL INCISIONLESS FUNDOPLICATION







TIF INCLUSION CRITERIA

- Age 18+
- GERD for > 1 year
- ~~Hiatal hernia ≤ 2 cm~~ ideally NO hernia
- History of daily PPIs for > 6 months
- Daily, bothersome GERD symptoms
- Hill grade I – II at gastroesophageal junction
- Proven gastroesophageal reflux by either endoscopy, ambulatory pH or barium swallow testing?

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TIF EXCLUSION CRITERIA

- BMI > 35
- Hiatal hernia > 2 cm
- Esophagitis grade C or D, Barrett's esophagus > 2 cm, ulcer
- Fixed esophageal stricture or narrowing
- Portal hypertension and/or varices, coagulation disorders
- Active gastro-duodenal ulcer disease
- Gastric outlet obstruction or stenosis
- Gastroparesis
- Age < 18
- Major connective tissue disorder
- Anatomy unsuitable for device placement

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TEMPO 3YR: TIF 2.0 VS. MAX PPI

Objective Measurements

# of reflux episodes
172 ± 84 to 107 ± 72
($p < 0.001$)

Mean total % time pH <5.3
10.2 to 7.8
($p = 0.017$)

Esophagitis
healed in
87%
(20/23)

Subjective Measurements

Regurgitation
91%
reported elimination
(39/43)

RSI score
normalized ≤ 13 in
87% of patients
(40/46)

Atypical symptoms
in the mean RSI score
21.9 ± 9.0 on PPIs
to 4.2 ± 7.3 ($p < 0.001$)

GERD-HRQL score
26.3 ± 9.3 on PPIs
to 5.4 ± 8.4 off PPIs
($p < 0.001$)

GERD-HRQL & RSI scores
12- and 36-months:
stable
($p > 0.05$)

Daily PPI use:
70% d/c
(38/54)

Trad et al. Surg Endosc 2016

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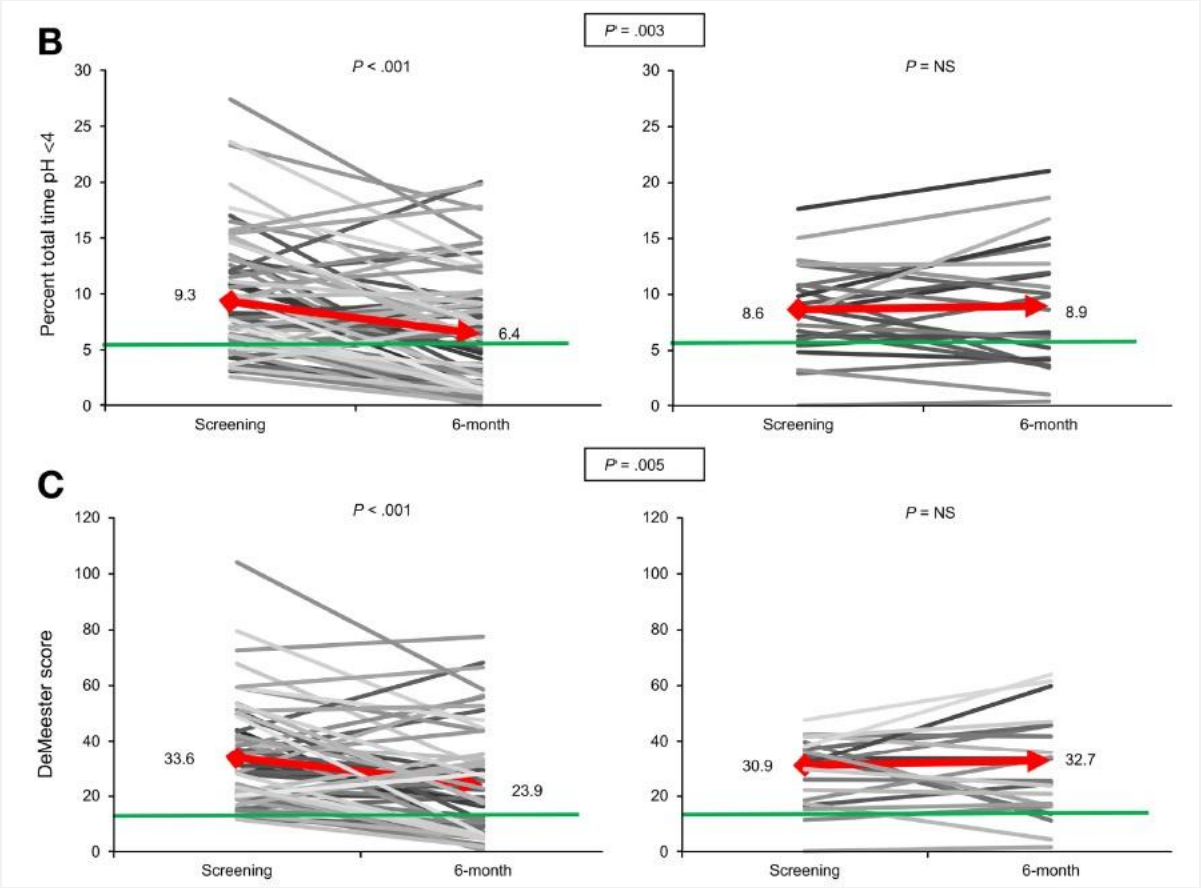
RESPECT TRIAL

- Prospective, sham-controlled trial
- Determine if TIF reduced troublesome regurg more than PPIs in patients with GERD.
- Screened 696 pts: GERD sx on daily PPI (<2cm hernia)
- Groups: TIF & 6 months of placebo, n = 87
  - sham surgery & 6 mos QD or BID PPI, n = 42
- Blinded to therapy during follow-up
- Reassessed at 2, 12, and 26 weeks.
- 6 mos: 48-hour pH monitoring and EGD

- Hunter et al. Gastroenterology 2015



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5 YEAR DURABILITY

- 45 GERD pts, LA A or B esophagitis & pH test
- Hernia <2cm
- Median 59month follow-up

- GERD-HQRL improved 27-4
- HB eliminated 57%
- Regurg eliminated 88%
- Main symptom eliminated 73%

Stefanidis et al. DOE 2017

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C-TIF

Original article

Thieme

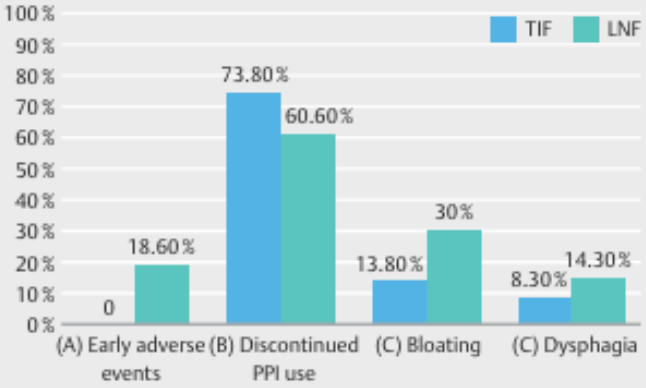
Hiatal hernia repair with transoral incisionless fundoplication versus Nissen fundoplication for gastroesophageal reflux disease: A retrospective study

OPEN ACCESS

Authors

Veeravich K. Jaruvongvanich[1], Reem Matar[1], Janani Reisenauer[2], Peter Janu[3], Peter Mavrelis[4], Glenn Ihde[5], Michael Murray[6], Sneha Singh[1], Jennifer Kolb[7], Ninh T. Nguyen[8], Nirav Thosani[9], Erik B. Wilson[10], Rasa Zarnegar[11], Kenneth Chang[7], Marcia I. Canto[12], Barham K. Abu Dayyeh[1]

- Multicenter retrospective cohort study
- 125 cTIF
- 70 Nissen
- cTIF with lower early and serious AE's



▶ **Fig. 3** **a** Percentage of patients with early AEs. **b** Percentage of patients who discontinued PPI use at 6 months. **c** Percentage of patients with new or worse than baseline bloating at 6 months. **d** Percentage of patients with new or worse than baseline dysphagia at 6 months. TIF, transoral incisionless fundoplication; LNF, laparoscopic Nissen fundoplication.

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	TIF group (N = 125)	LNF group (N = 70)	*P* value
Baseline/procedure			
Age (years, mean ± SD)	55.1 ± 14.5	60.9 ± 13.4	0.005
Female [n (%)]	71 (56.8)	43 (61.4)	0.53
BMI (kg/m^2, mean ± SD)	29.1 ± 5.0	29.2 ± 4.2	0.97
PPI use [n (%)]	119 (95.2)	66 (94.3)	0.78
Length of hospital stay (days, median [IQR])	1 (1–1)	2 (1–2)	<0.001
Readmission in 30 days [n (%)]	0	3 (4.3)	0.013
Adverse event [n (%)]			
▪ Early (< 30 days)	0	13 (18.6)	<0.001
▪ Early serious	0	3 (4.3)	<0.001
At 6 months [n (%)]			
▪ Discontinued PPI use	76 (73.8)	40 (60.6)	0.07
▪ Decreased PPI use	88 (85.4)	55 (83.3)	0.71
▪ Start PPI use	0	0	–
▪ Bloating (new or worse than baseline)	15 (13.8)	21 (30.0)	0.009
▪ Dysphagia (new or worse than baseline)	9 (8.3)	10 (14.3)	0.21
▪ No PPI use with no symptoms	65 (60.8)	44 (62.9)	0.78
▪ PPI use with continued symptoms	14 (13.1)	3 (4.3)	0.04
At 12 months [n (%)]			
▪ Discontinued PPI use	50 (73.5)	35 (58.3)	0.07
▪ Decreased PPI use	57 (83.8)	47 (78.3)	0.43
▪ Start PPI use	0	0	–
▪ Bloating (new or worse than baseline)	10 (14.9)	15 (24.2)	0.18
▪ Dysphagia (new or worse than baseline)	7 (10.1)	8 (12.9)	0.62
▪ No PPI use with no symptoms	32 (52.5)	36 (58.1)	0.53
▪ PPI use with continued symptoms	8 (13.1)	3 (4.8)	0.10

BMI, body mass index; IQR, interquartile range; LNF, laparoscopic Nissen fundoplication; PPI, proton pump inhibitor; SD, standard deviation; TIF, transoral incisionless fundoplication.

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CONCLUSIONS

- There are multiple surgical options for hiatal hernias
- Asymptomatic hiatal hernias can be safely observed
- Varying efficacy and side effect profiles for antireflux procedures

CME/MOC Question:

Which of the following is not an indication for antireflux surgery in a patient with a 2cm sliding hiatal hernia?

A) LA grade C esophagitis that healed with PPI use, but desire to stop PPI

B) Progression no intestinal metaplasia to long segment Barrett's esophagus despite ongoing PPI

C) Daily heartburn with no esophagitis, no intestinal metaplasia, and acid exposure time <4% on pH testing

D) Daily breakthrough heartburn with LA Grade C esophagitis despite PPI

Joint Providership

ASGE

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CME/MOC Answer

C) Daily heartburn with no esophagitis, no intestinal metaplasia, and acid exposure time <4% on pH testing

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