Endoscopic Third Space Applications for the Treatment of Obesity

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Disclosures

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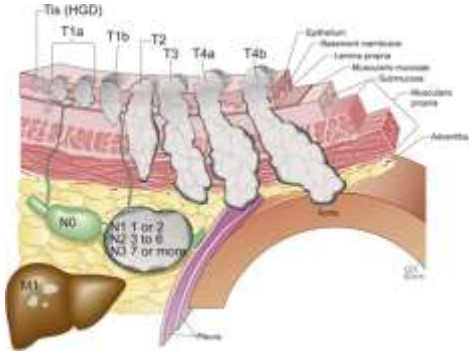
Lumendi – Consultant/Institutional Research Grant
Olympus – Consultant (Consulting Fees)/Research Support (Equipment Loans)
USGI Medical – Institutional Research Grant

Third Space Endoscopy

Tissue Resection: ESD / STER

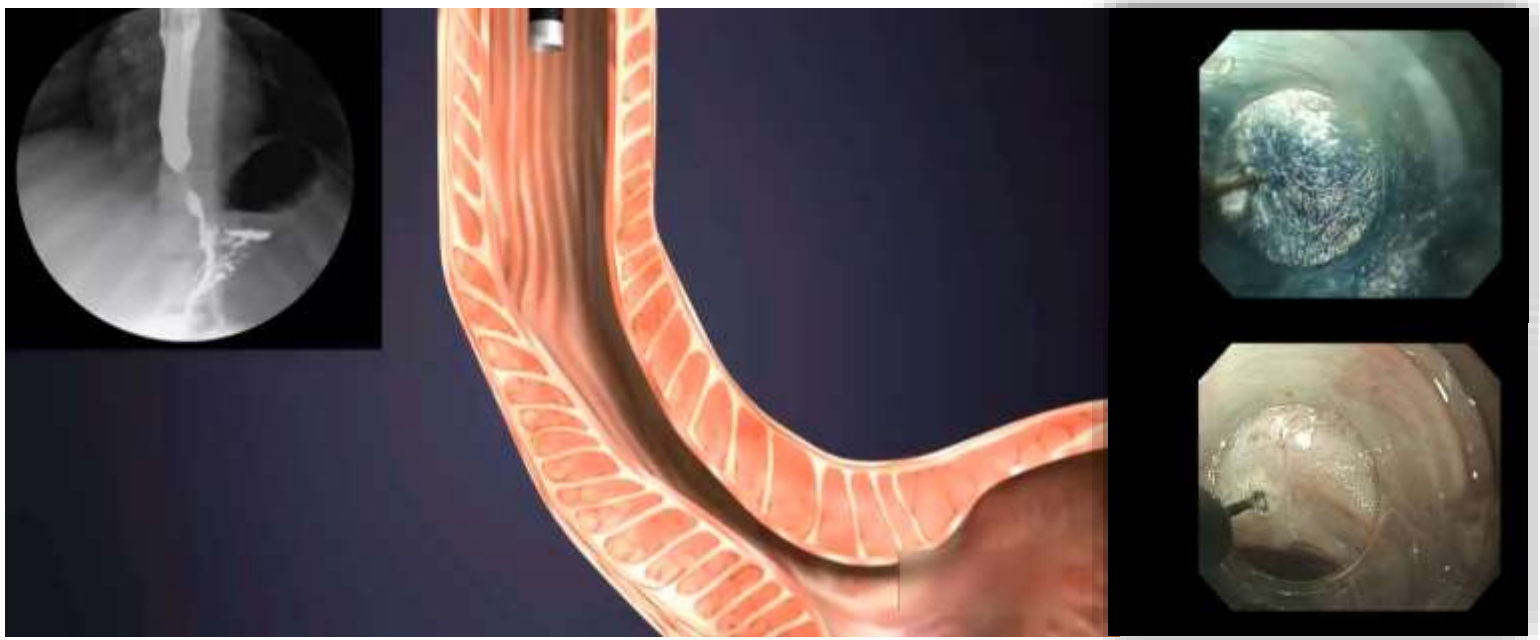


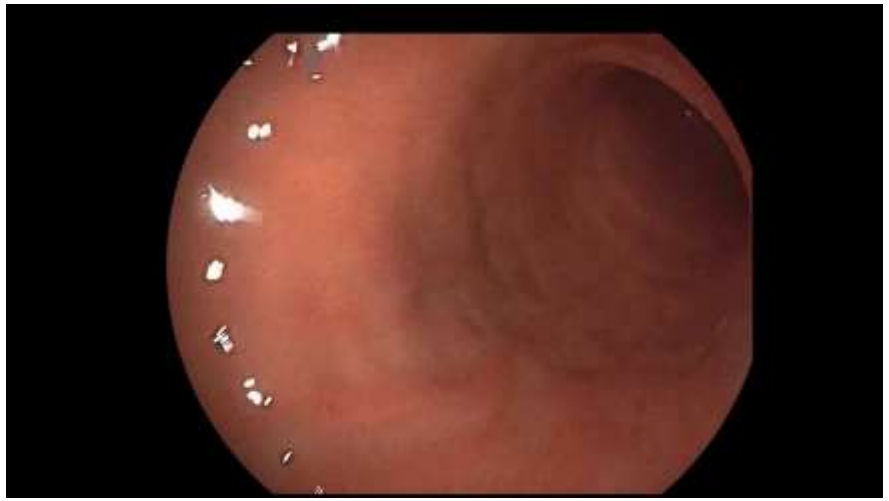
ESD: 1) Mark 2) Lift 3) Incision 4) Dissection

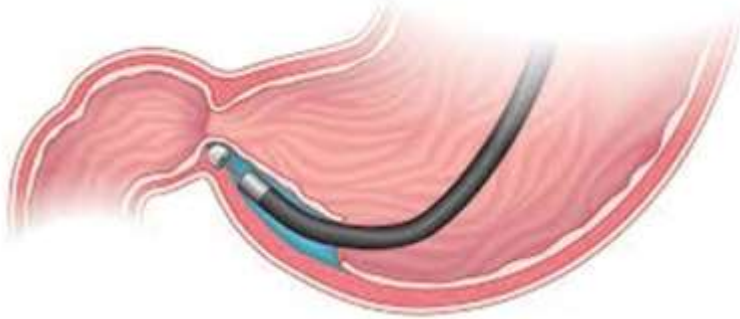
STER: 1) Inject / access 2) Tunnel 3) Dissect 4) Close

Third Space Endoscopy

Tunneled Myotomies







Third Space Endoscopy

Intersection with Bariatric Endoscopy

Augment existing EBMTs

- Tissue preparation to promote healing
- Adding additional mechanism of action

Creation of new bariatric procedures

- Addressing specific pathophysiology
- Altering normal physiology for a novel treatment effect

Third Space Endoscopy

Bariatric Procedures

Tissue preparation to promote healing

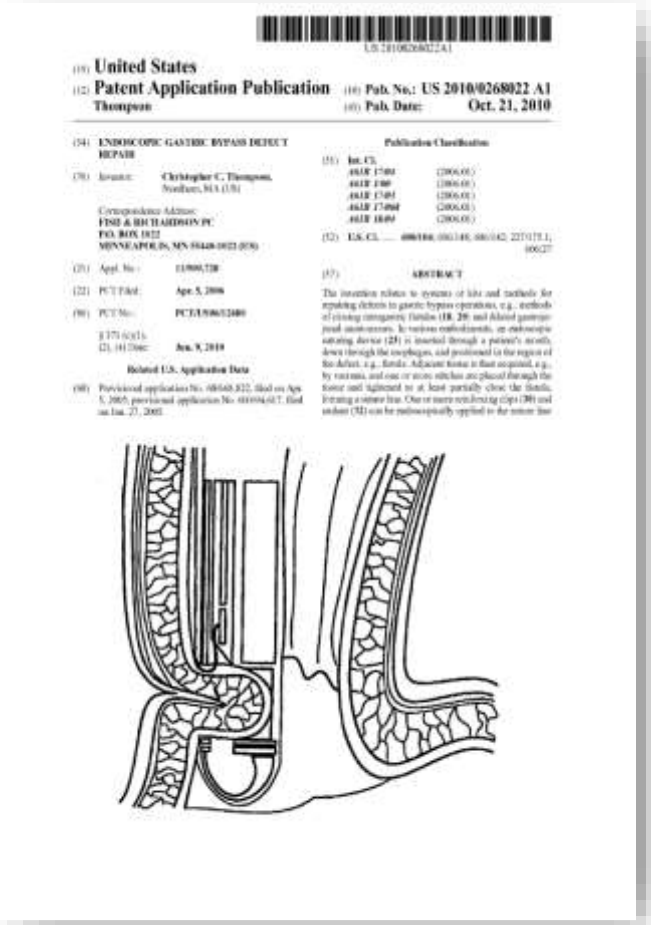
- Fistula closure (EFTR Fistula Take Down)
- RYGB revision (ESD-TORe)

Addressing specific pathophysiology

- Treatment of sleeve gastrectomy stenosis (Tunneled Stricturotomy)

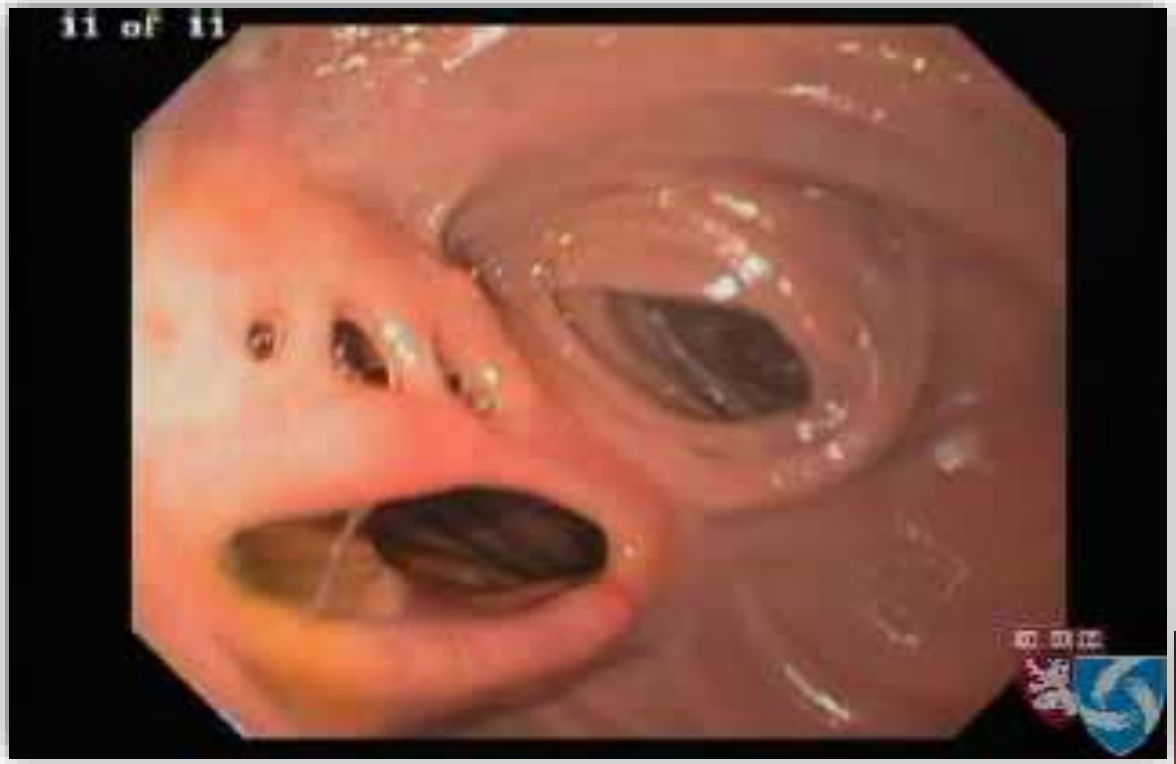
Altering normal physiology for a unique treatment effect

- Additional mechanism of action for an existing EBMT (GEM)
- Novel primary EBMT (BEAM)



Tissue Preparation

Gastrogastric Fistula

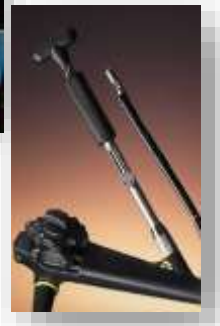


95 patients with GGF

Avg 2.2 sutures placed

- 95% initial closure rate
- 65% re-open at avg 177 days
- Fistula < 1 cm predicts better response with durable closure in over 30% (mean f/u 395 days)

No fistula over 2 cm remained closed



Tissue Preparation

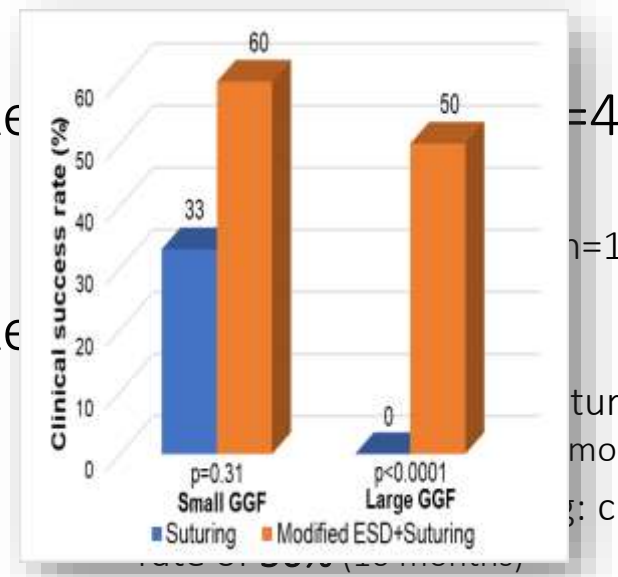
Gastrogastric Fistula - EFTR with Fistula Take Down

Re =41)

=11)

Re

turing: clinical
months)
: clinical success



Tissue Preparation

TORe for Revision of RYGB

Factors important for good outcomes

- Tissue preparation
- Suture depth and type of apposition
- Suture pattern
- Final outlet size

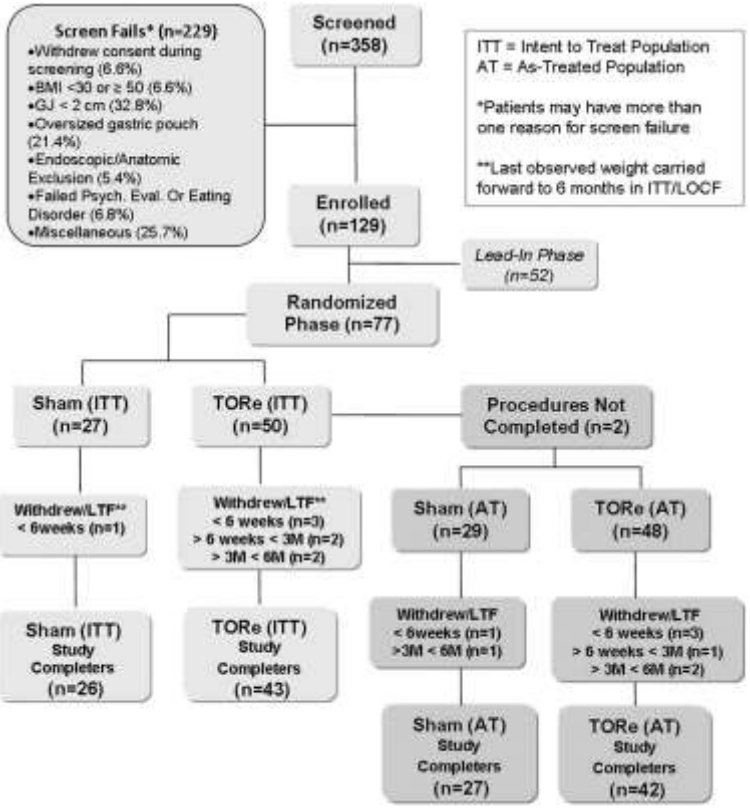
Endoscopic Suturing for Transoral Outlet Reduction Increases Weight Loss After Roux-en-Y Gastric Bypass Surgery

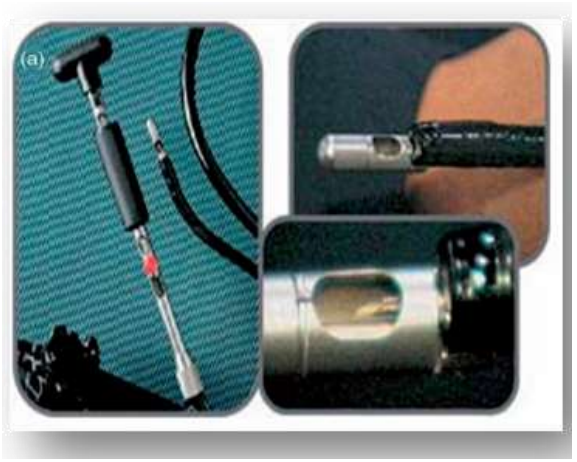
CHRISTOPHER C. THOMPSON,[1] BIPAN CHAND,[2] YANG K. CHEN,[3] DANIEL C. DEMARCO,[4] LARRY MILLER,[5] MICHAEL SCHWEITZER,[6] RICHARD I. ROTHSTEIN,[7] DAVID B. LAUTZ,[8] JAMES SLATTERY,[1] MICHELE B. RYAN,[1] STACY BRETHAUER,[9] PHILLIP SCHAUER,[9] MACK C. MITCHELL,[10] ANTHONY STARPOLI,[11] GREGORY B. HABER,[11] MARC F. CATALANO,[12] STEVEN EDMUNDOWICZ,[13] ANNETTE M. FAGNANT,[14] LEE M. KAPLAN,[15] and MITCHELL S. ROSLIN[16]

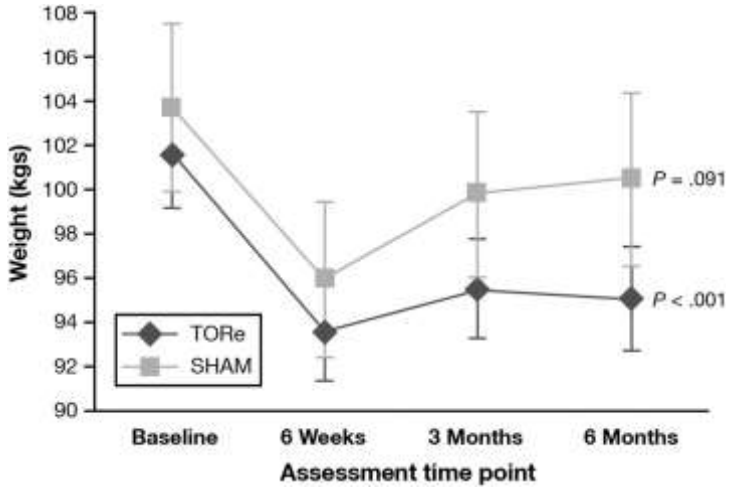
Gastro
aga American Gastroenterological Association

3.5% TWL

RESTORe Trial – Sham controlled RCT with 6 month crossover







Primary outcomes analyses: percentage weight lost from baseline				
	TORe	Sham control	Treatment difference[a]	
Analysis population	LS mean (95% CI)	LS mean (95% CI)	LS Mean (95% CI)	*P* value
ITT population: LOCF	3.5 (1.8–5.3)	0.4 (-2.3 to 3.0)	3.2 (0.5–5.9)	.021
ITT population: only patients completing study	3.8 (1.8–5.8)	0.3 (-2.8 to 3.3)	3.5 (0.6–6.5)	.020
As treated population: only patients completing study	3.9 (1.9–5.9)	0.2 (-2.8 to 3.2)	3.7 (0.8–6.6)	.014

Comparison of a superficial suturing device with a full-thickness suturing device for transoral outlet reduction (with videos)

Nitin Kumar, MD, Christopher C. Thompson, MD

GIE GASTROINTESTINAL ENDOSCOPY

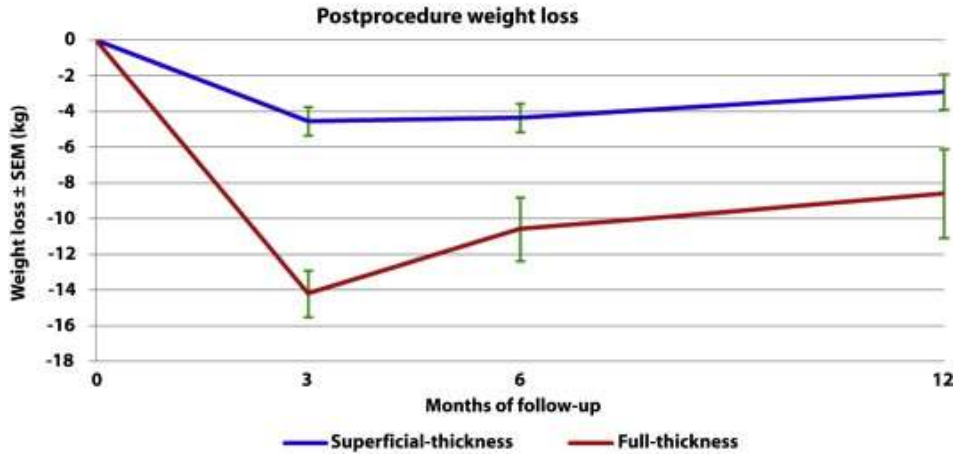
6% TWL

59 consecutive patients FT TORe matched to 59 of 129 ST TORe

TABLE 1. Baseline characteristics (matched cohort)

	Superficial (n = 59)	Full-thickness (n = 59)	*P* value
Sex,* no.	3 M/56 F	15 M/44 F	< .01
Age, y	48.8 ± 1.1†	49.9 ± 1.3	.52
Diabetes mellitus, %	17.2	23.7	.49
Lost weight regained, %	32.5 ± 3.0	40.9 ± 3.2	.06
Weight regained, kg	18.7 ± 1.8	18.6 ± 1.5	.97
Before TORe BMI	40.4 ± 1.0	41.1 ± 1.3	.67
Before TORe GJA, mm	24.3 ± 0.8	24.8 ± 0.9	.68
Before TORe pouch, mm	51.8 ± 1.5	49.7 ± 2.4	.46

M, Male; *F*, female; *TORe*, transoral outlet reduction; *BMI*, body mass index; *GJA*, gastrojejunal anastomosis.
*Statistical significance.
†(Mean ± SEM)



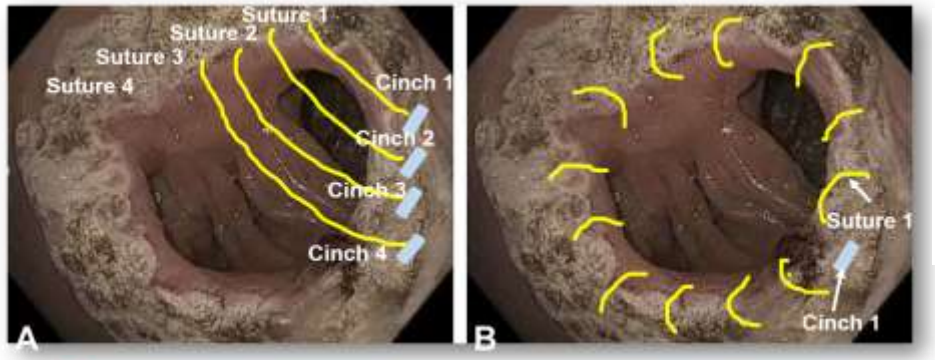
Transoral outlet reduction: a comparison of purse-string with interrupted stitch technique

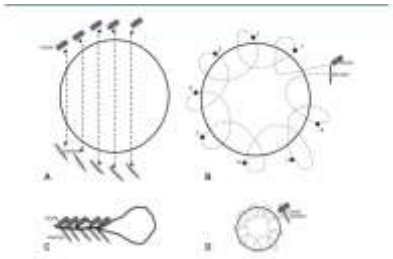
Allison R. Schulman, MD, MPH,[1,2] Nitin Kumar, MD,[3]
Christopher C. Thompson, MD, MSc, FASGE, FACG, AGAF[1,2]

GIE
GASTROINTESTINAL ENDOSCOPY

8.6% TWL

Analysis of a prospective registry including 241 patients (purse string (PS) 187, interrupted (I) 54)





12 months - PS vs I
%TWL (8.6 vs 6.4, P 0.02)
%EWL (19.8 vs 11.7, P < .001)
%RWL (40.2 vs 27.8, P 0.02)
Total weight loss (9.5 vs 7.8, P 0.04)

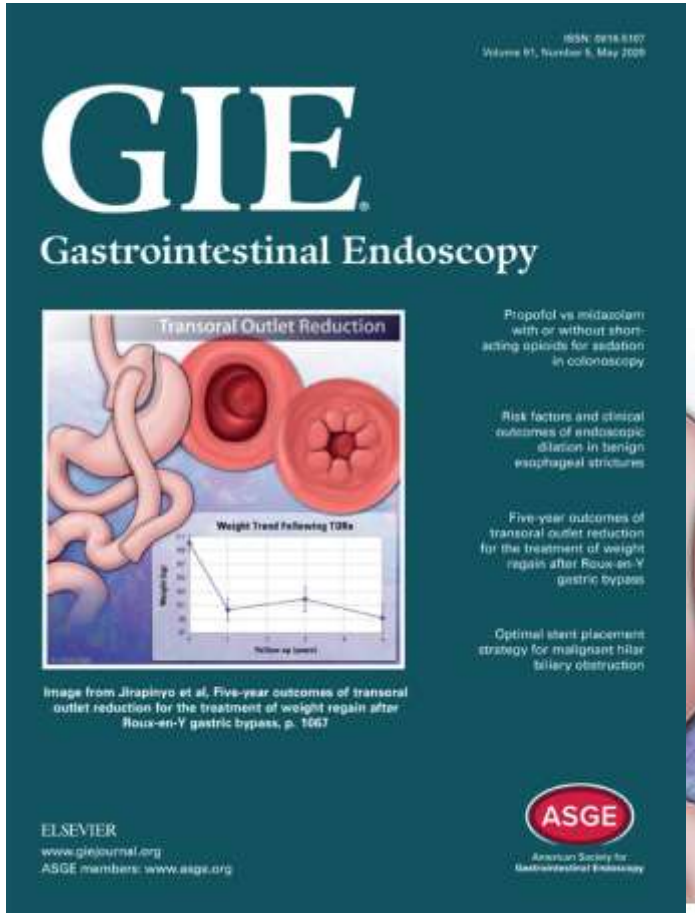
TABLE 3. Results from univariable and multivariable regression analyses

	Univariate analysis		Multivariable analysis	
Risk factors	**Beta estimate**	***P* value**	**Adjusted beta estimate**	***P* value**
Age, y	−.02 ± .05	NS	.02 ± .10	NS
Male, n	1.93 ± .61	NS	2.34 ± 1.59	NS
Percent regain after initial RYGB	.03 ± .01	<.01*	.03 ± .01	<.01*
Technique (interrupted = reference)	3.20 ± 1.23	.01*	3.51 ± 1.26	<.01*
Pre-GJA size	−.19 ± .21	NS	.05 ± .09	NS

Five-year outcomes of transoral outlet reduction for the treatment of weight regain after Roux-en-Y gastric bypass

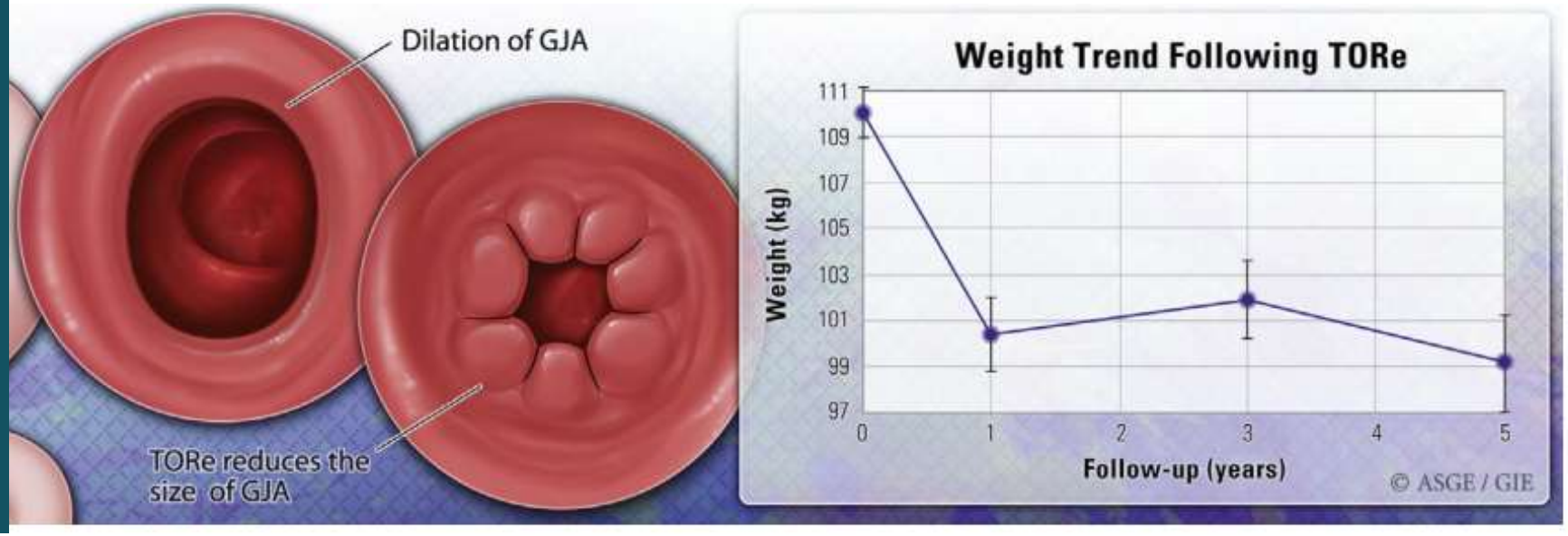
Pichamol Jirapinyo, MD, MPH,[1] Nitin Kumar, MD,[2] Mohd Amer AlSamman, MD,[3] Christopher C. Thompson, MD, MSc[1]

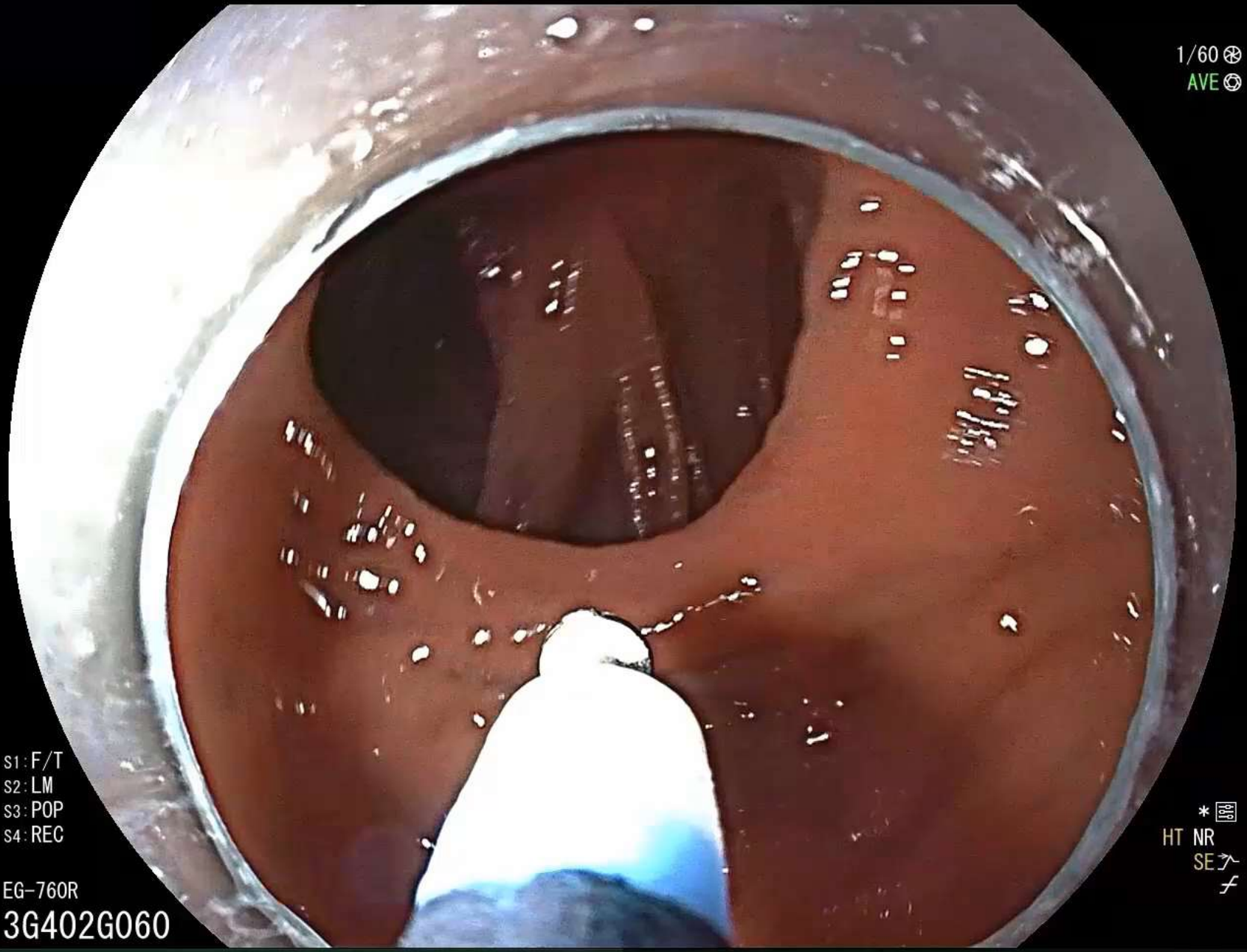
GIE GASTROINTESTINAL ENDOSCOPY



331 patients with baseline BMI of 40 ± 9 kg/m^2

Efficacy at 5 years: **8.8% TWL (62% maintained 5% TWL)**



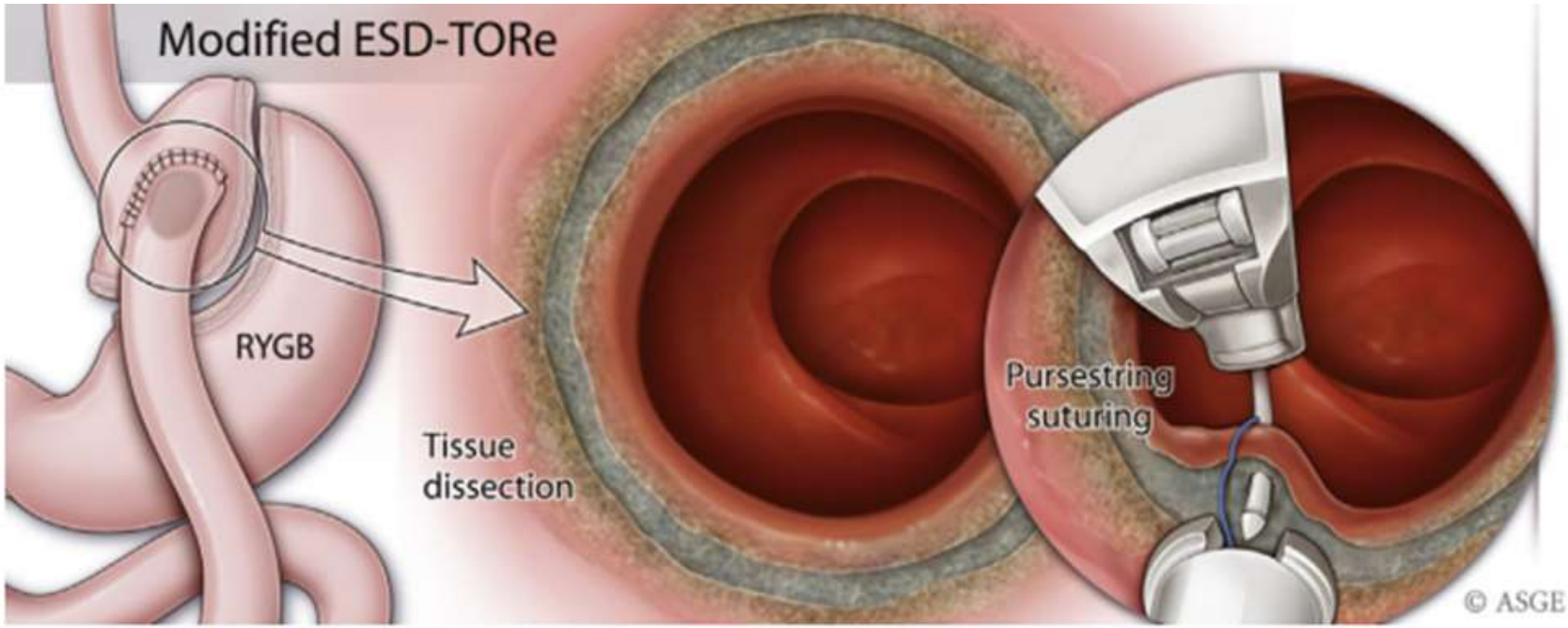

1/60
AVE
S1:F/T
S2:LM
S3:POP
S4:REC
EG-760R
3G402G060
HT NR
SE
BL-7000
4

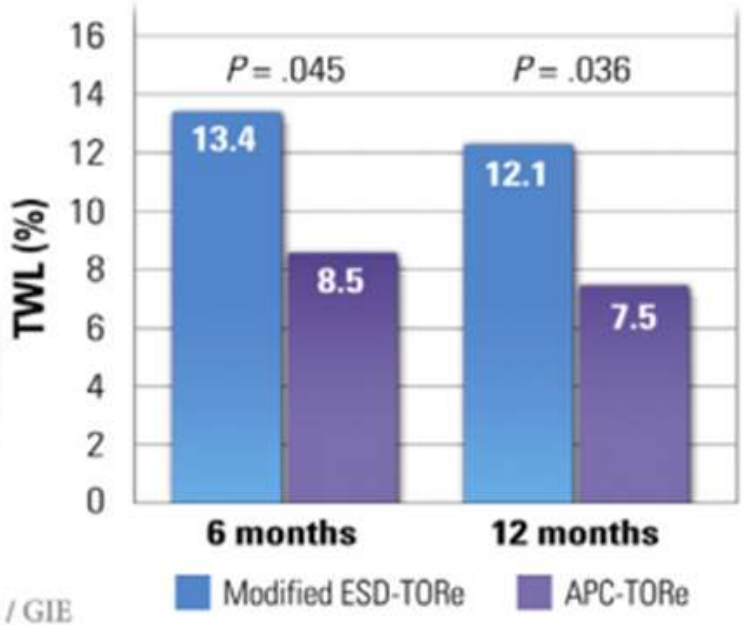
Endoscopic submucosal dissection with suturing for the treatment of weight regain after gastric bypass: outcomes and comparison with traditional transoral outlet reduction (with video)

GIE GASTROINTESTINAL ENDOSCOPY

Pichamol Jirapinyo, MD, MPH,[1,2] Diogo T. H. de Moura, MD, PhD,[1,2,3] Christopher C. Thompson, MD, MSc[1,2]

12% TWL





Matched based on GJA and pouch sizes

Third Space Endoscopy

Bariatric Procedures

Tissue preparation to promote healing

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Addressing specific pathophysiology

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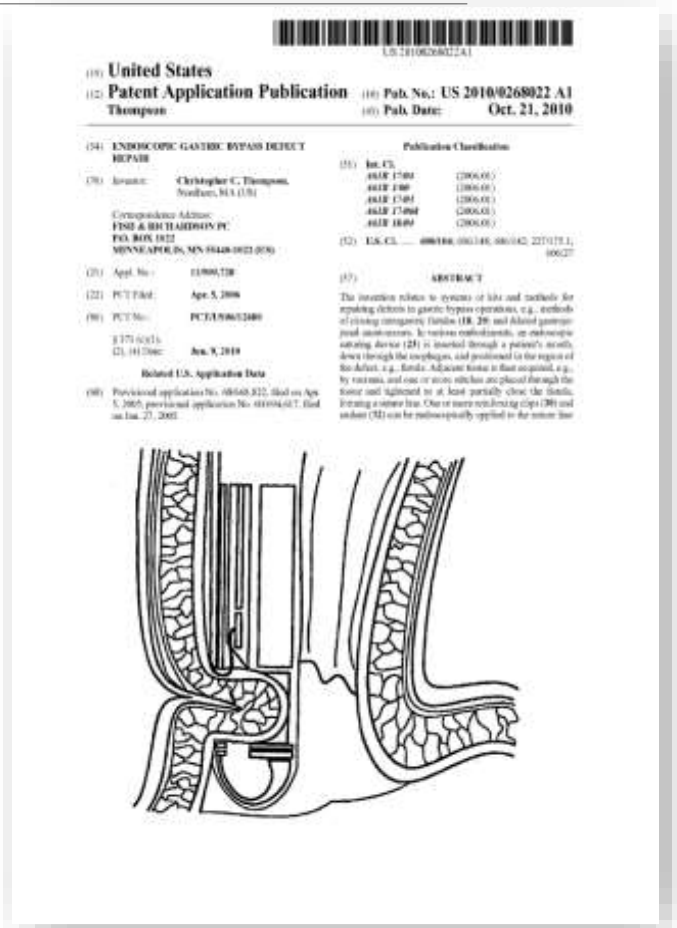

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(12) Patent Application Publication
Thompson
(10) Pub. No.: US 2010/0268022 A1
(43) Pub. Date: Oct. 21, 2010

(54) ENDOSCOPIC GASTRIC BYPASS DEFECT REPAIR

(75) Inventor: Christopher C. Thompson, Needham, MA (US)

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(21) Appl. No.: 11/800,728

(22) PCT Filed: Apr. 5, 2006

(86) PCT No.: PCT/US06/12480

§ 371 (c)(1),
(2), (4) Date: Jun. 9, 2010

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Publication Classification

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A61F 1/00 (2006.01)
A61F 17/03 (2006.01)
A61F 17/064 (2006.01)
A61F 18/00 (2006.01)

(52) U.S. Cl. 606/148; 606/140; 606/142; 227/175.1; 606/27

(57) ABSTRACT

The invention relates to systems or kits and methods for treating defects in gastric bypass operations, e.g., methods of treating iatrogenic fistulas (18, 20) and related gastrojejunal anastomoses. In various embodiments, an endoscopic suturing device (24) is inserted through a patient's mouth, down through the esophagus, and positioned in the region of the defect, e.g., fistula. Adjacent tissue is then acquired, e.g., by vacuum, and one or more stitches are placed through the tissue and tightened to at least partially close the fistula, forming a suture line. One or more retaining clips (30) and sealant (32) can be endoscopically applied to the suture line

Sleeve Gastrectomy Stenosis

Tunneled Stricturotomy

Case

22 yo with LSG in 2017 and dysphagia to solids and regurgitation / emesis

Excessive weight loss and malnutrition

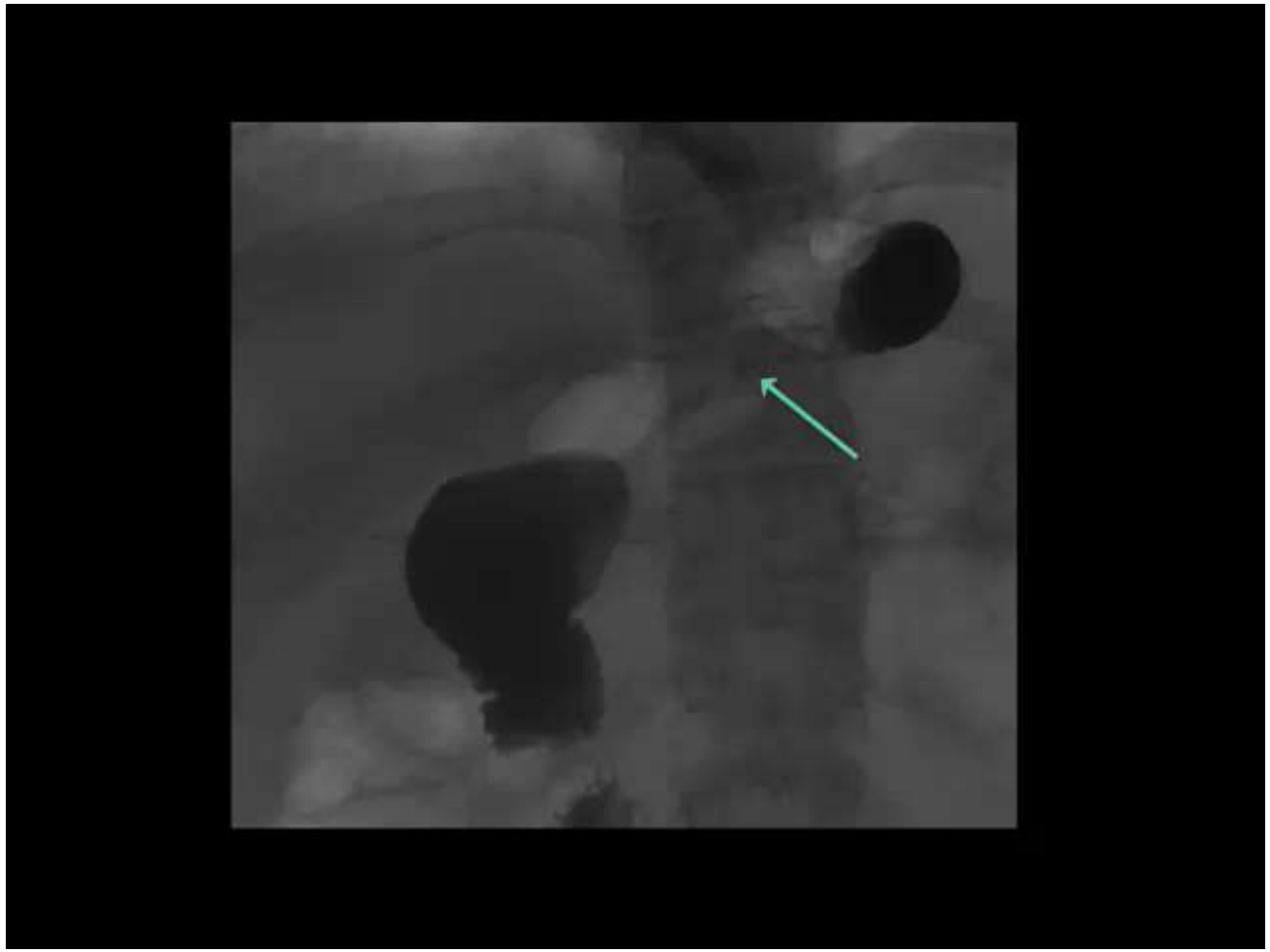
Sleeve stenosis seen on UGI and failed pneumatic balloon dilation x3

Retrospective Review (n=13)

Primary endpoint: clinical success (symptom improvement, resumption of adequate oral intake, no further intervention)

Results

- Helical GSS (85%)
- Prior GSS treatment (77%)
- No SAE's
- Intra-procedural complications (mucosotomies = 2)
- Clinical Success (Median 175 days): 77%
- Change in GCSI: 2.06 (IQR 1.5–2.8) to 0.39 (IQR 0.2–0.5)
- Surgical Revision: 23%



De Moura D, Jirapinyo P, Thompson CC. February 2019 Volume 4, Issue 2, Pages 68–71.
Zhang LY, et al. Endoscopy. 2022 Apr;54(4):376-381.

Third Space Endoscopy

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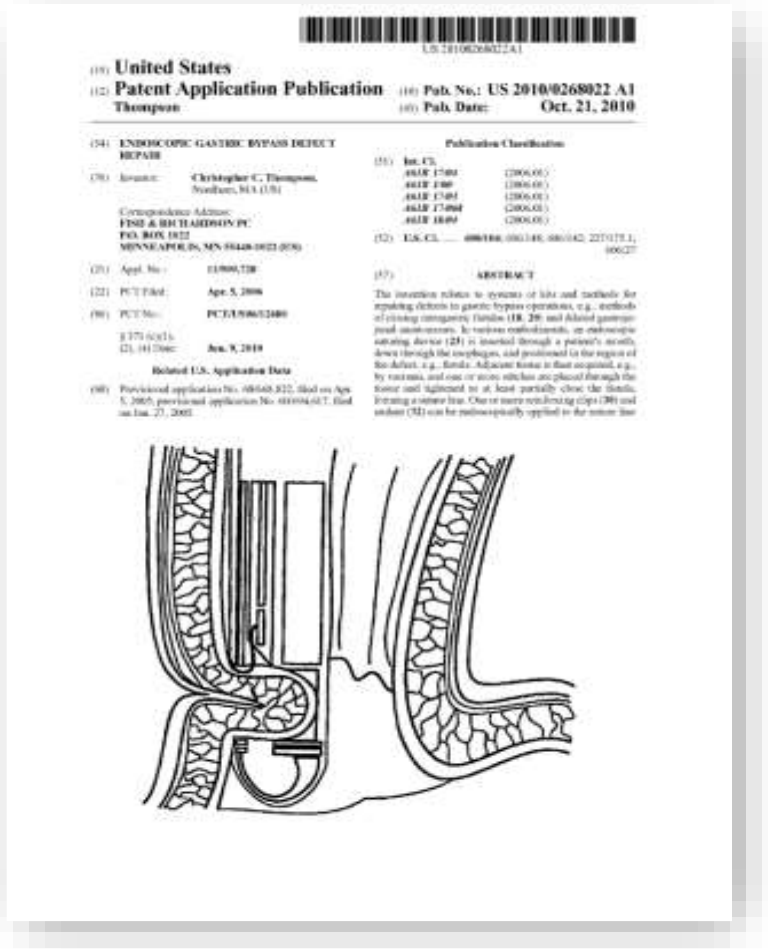

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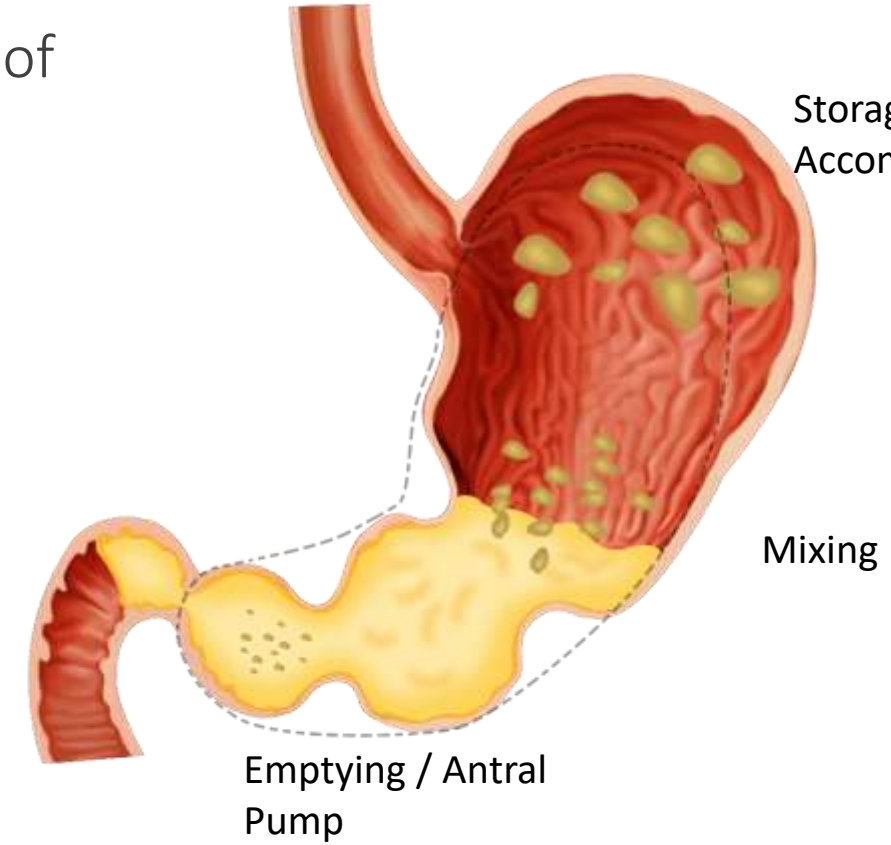
Gastric Physiology

Digestive physiology is critical to the understanding of endoscopic bariatric and metabolic therapies

Gastric motility:

- Storage: fundal accommodation
- Mixing: churning and breakdown of food into chyme
- Emptying: pump function of the distal body and antrum



Gastric Physiology

Bariatric Procedure Proposed Mechanisms of Action

Gastric interventions used to treat obesity work by interfering with the digestion of food and are typically thought to alter gastric motility

Gastroplasty with Endoscopic Myotomy (GEM)

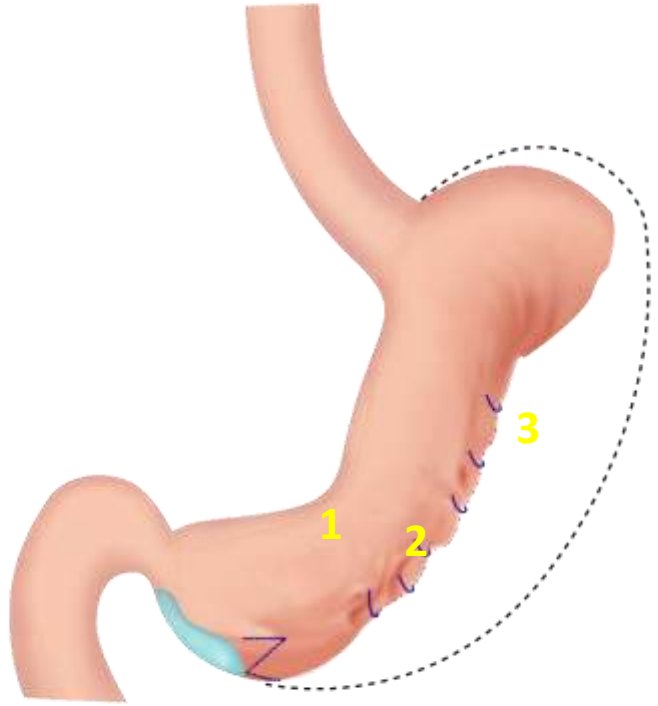
We propose a novel procedure that affects several aspects of gastric motility in an effort to produce greater and more durable weight loss

Gastroplasty with Endoscopic Myotomy (GEM)

Step 1: Pylorus-sparing antral myotomy
- Via a submucosal tunneling technique
- To weaken the antral pump

Step 2: A running suture (belt)
- At the incisura to separate the antrum from gastric body
- To minimize tension on the myotomy access site

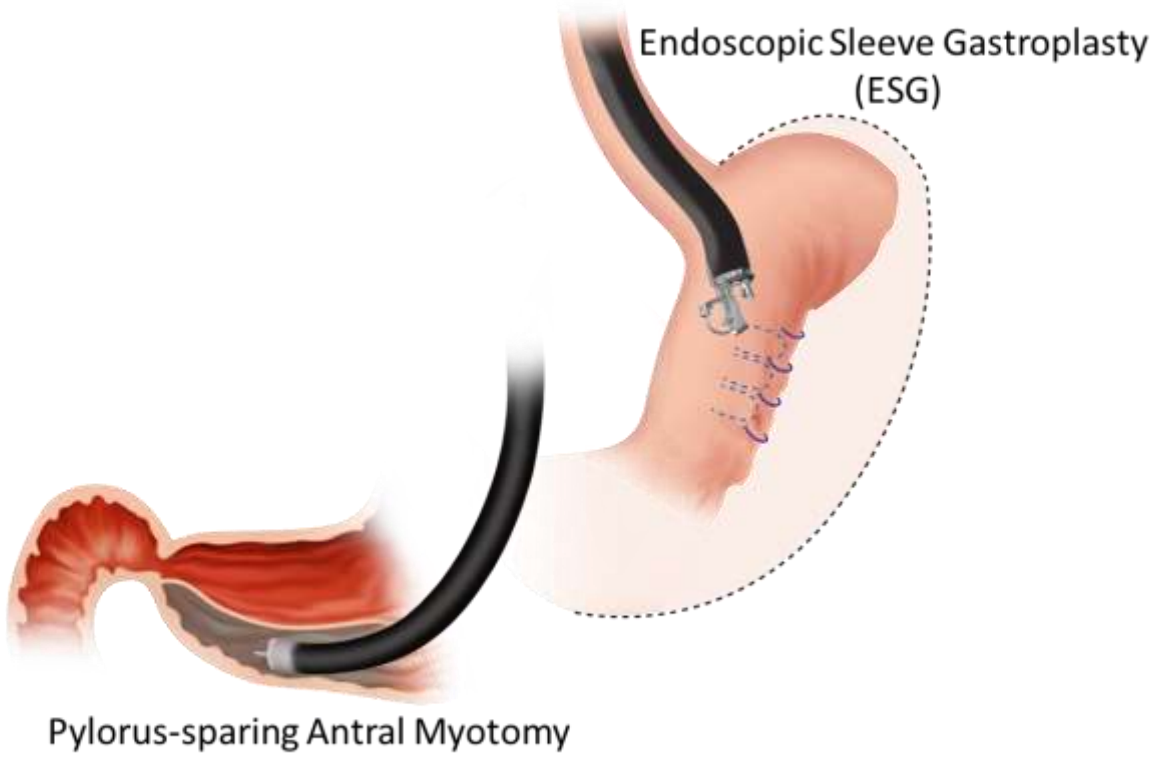
Step 3: Endoscopic sleeve gastroplasty (ESG)
- To reduce mixing and limit accommodation



Gastroplasty With Endoscopic Myotomy for the Treatment of Obesity: Preliminary Efficacy and Physiologic Results

Christopher C. Thompson, Pichamol Jirapinyo, Raj Shah, and Cem Simsek

Gastro aga



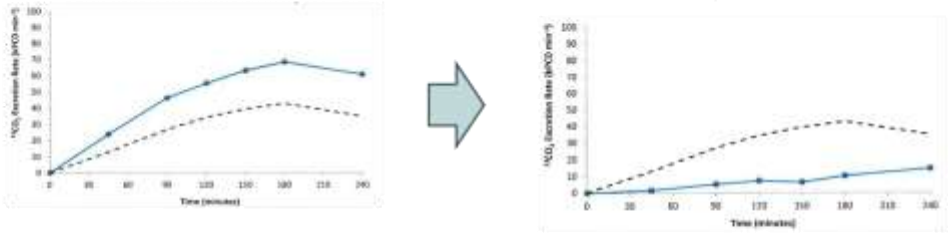
Gastroplasty with Endoscopic Myotomy (GEM)

N=6

At 1, 3 and 6 months, patients experienced 11.5 ± 2.9%, 14.8 ± 2.5% and 19.5 ± 1.4% TWL ($p < 0.0001$ for all)

100% of patients experienced ≥10% TWL

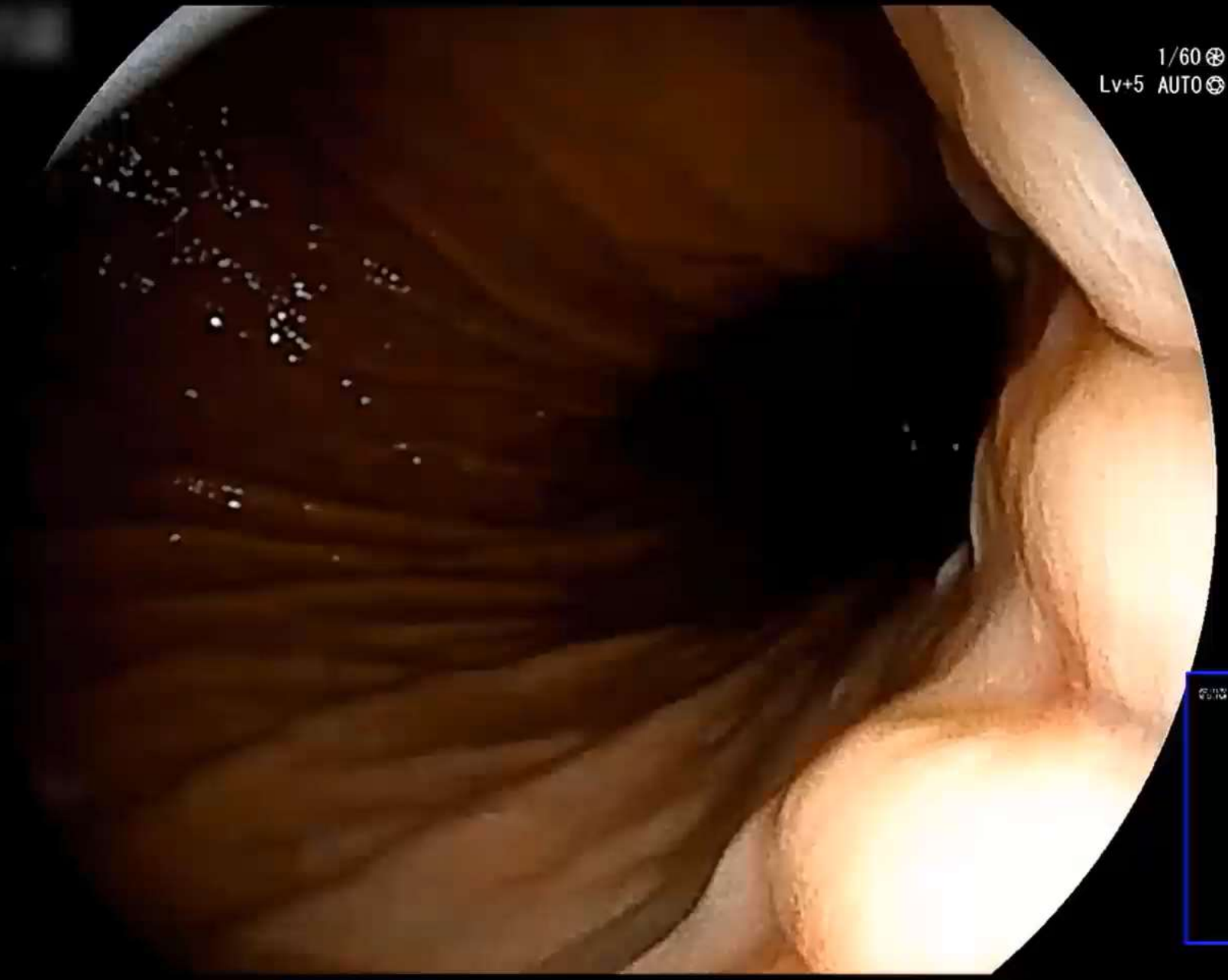
Gastric Emptying Breath Test (GEBT)
- Proportion of patients with delayed gastric emptying: 1/6 (17%) → 6/6 (100%) (p=0.02)
- Average T1/2 increased from 90 ± 58 minutes to 204 ± 18 minutes (p<0.0001)

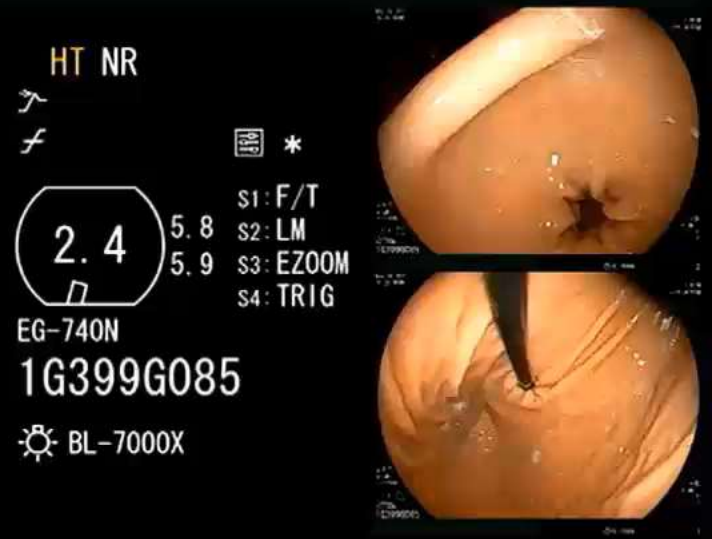


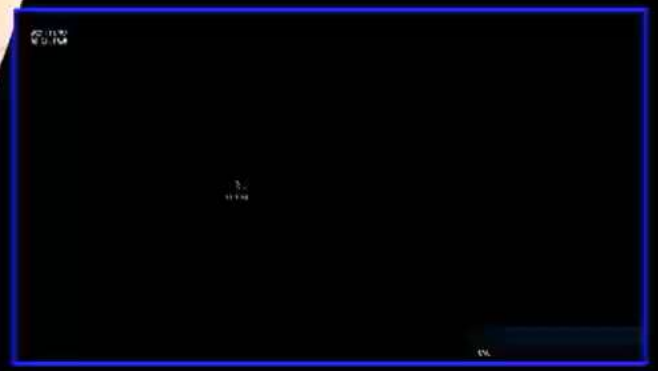
Gastroparesis Cardinal Symptom Index (GCSI)
- Total GCSI: 0.4 ± 0.4 → 0.6 ± 0.3 (p=0.63)
- Postprandial fullness/early satiety subscale: 0.2 ± 0.3 → 1.0 ± 0.5 (p=0.01)
- Nausea/vomiting subscale: 0 → 0.1 ± 0.3 (p=0.36)
- Bloating subscale: 1.6 ± 1.3 → 0.3 ± 0.4 (p=0.10)

GEM

Gastroplasty with
Endoscopic Myotomy

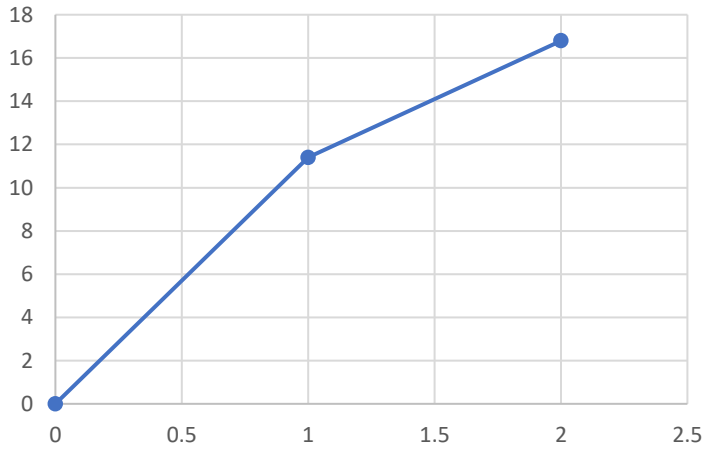




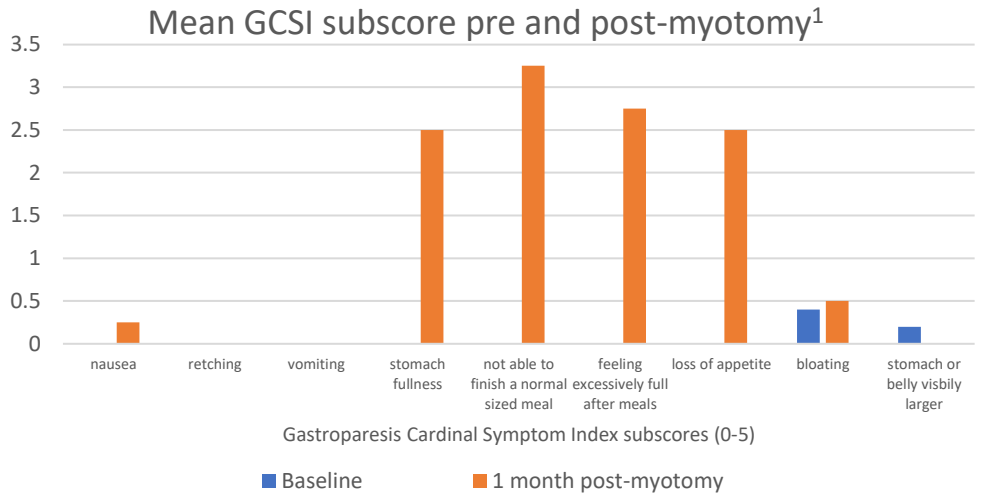


Bariatric Endoscopic Antral Myotomy (BEAM)

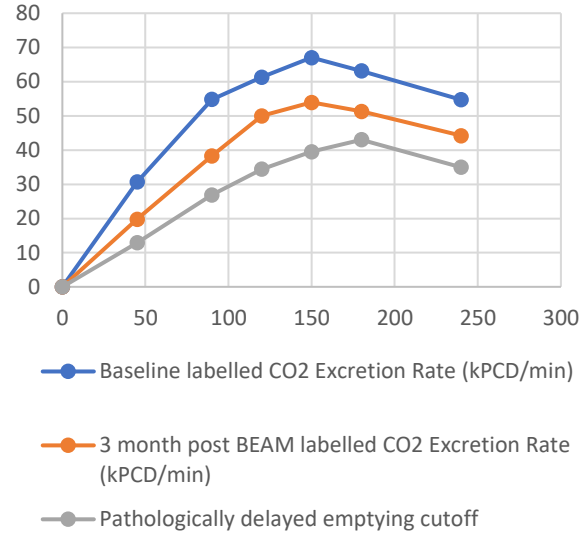
Mean % total weight loss by month post-BEAM[1]



Mean GCSI subscore pre and post-myotomy[1]



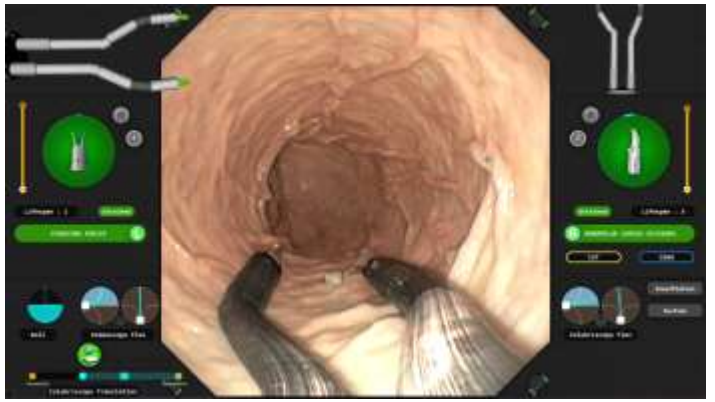
Gastric emptying rate pre and 3 months post BEAM[2]

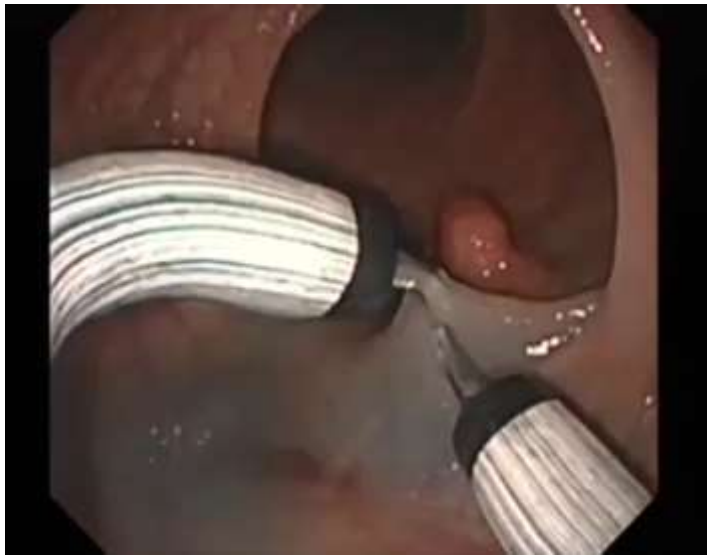


1) Sa1897 Bariatric Endoscopic Antral Myotomy (BEAM): Technical Feasibility and Preliminary Results of a Novel Weight Loss Procedure
Authors: Christopher C. Thompson, Roberto Trasolini, Pichamol Jirapinyo. DDW 2023 abstract library
2) Unpublished data*

Future Third Space EBMTs

Robotics





Conclusion

Third space techniques are making their way into bariatric endoscopy

These techniques appear to offer improved durability, greater weight loss, less variability, and potentially lower cost

Training and certification processes are the next hurdles to broader adoption of these techniques

BRIGHAM AND WOMEN'S HOSPITAL

THE HARVARD MEDICAL SCHOOL

Thank you!

@MetabolicEndo