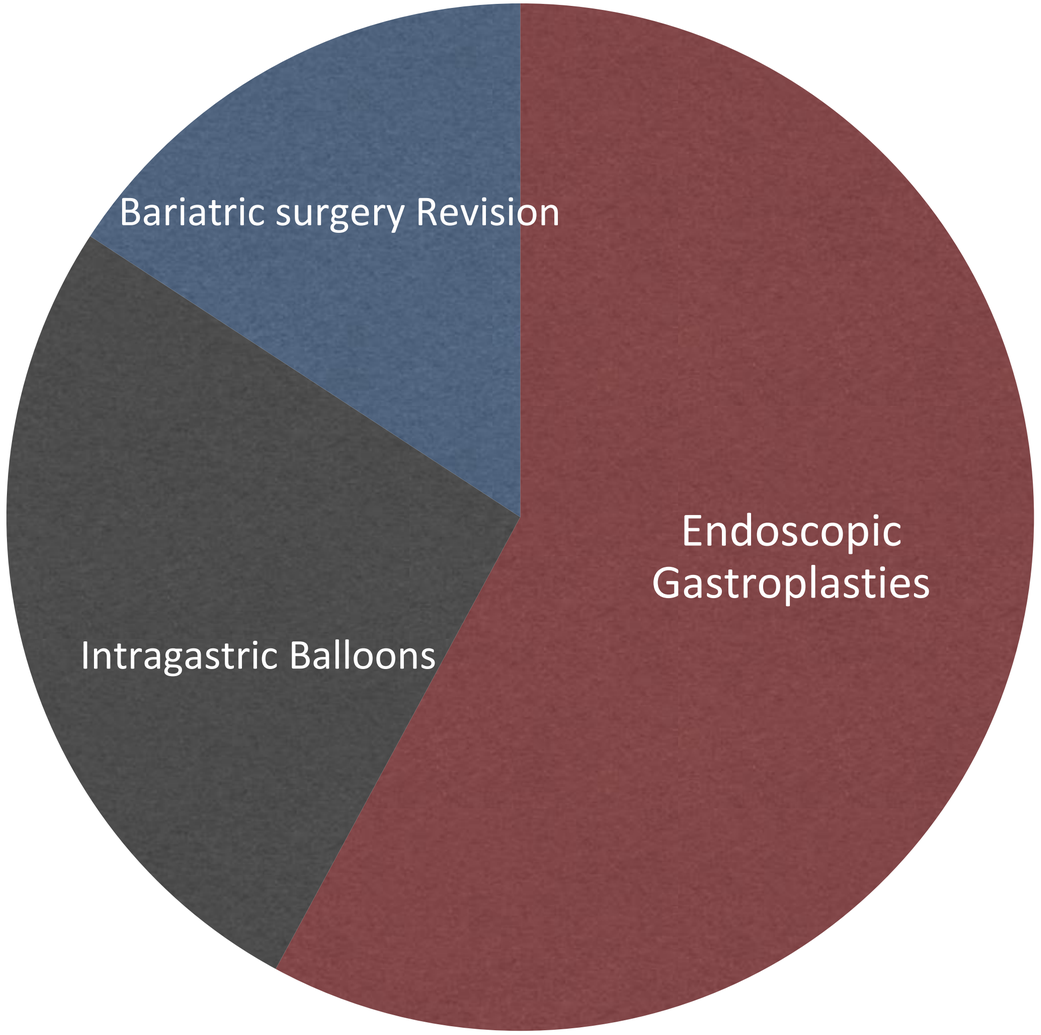
Gastric Remodelling Technique- Current and Future Platforms

Dr. Ravishankar Asokkumar, MBBS, MRCP (Gastro), FRCP (London), FASGE
Senior Consultant
Department of Gastroenterology and Hepatology
Singapore General Hospital
National Fellow, World Obesity Federation

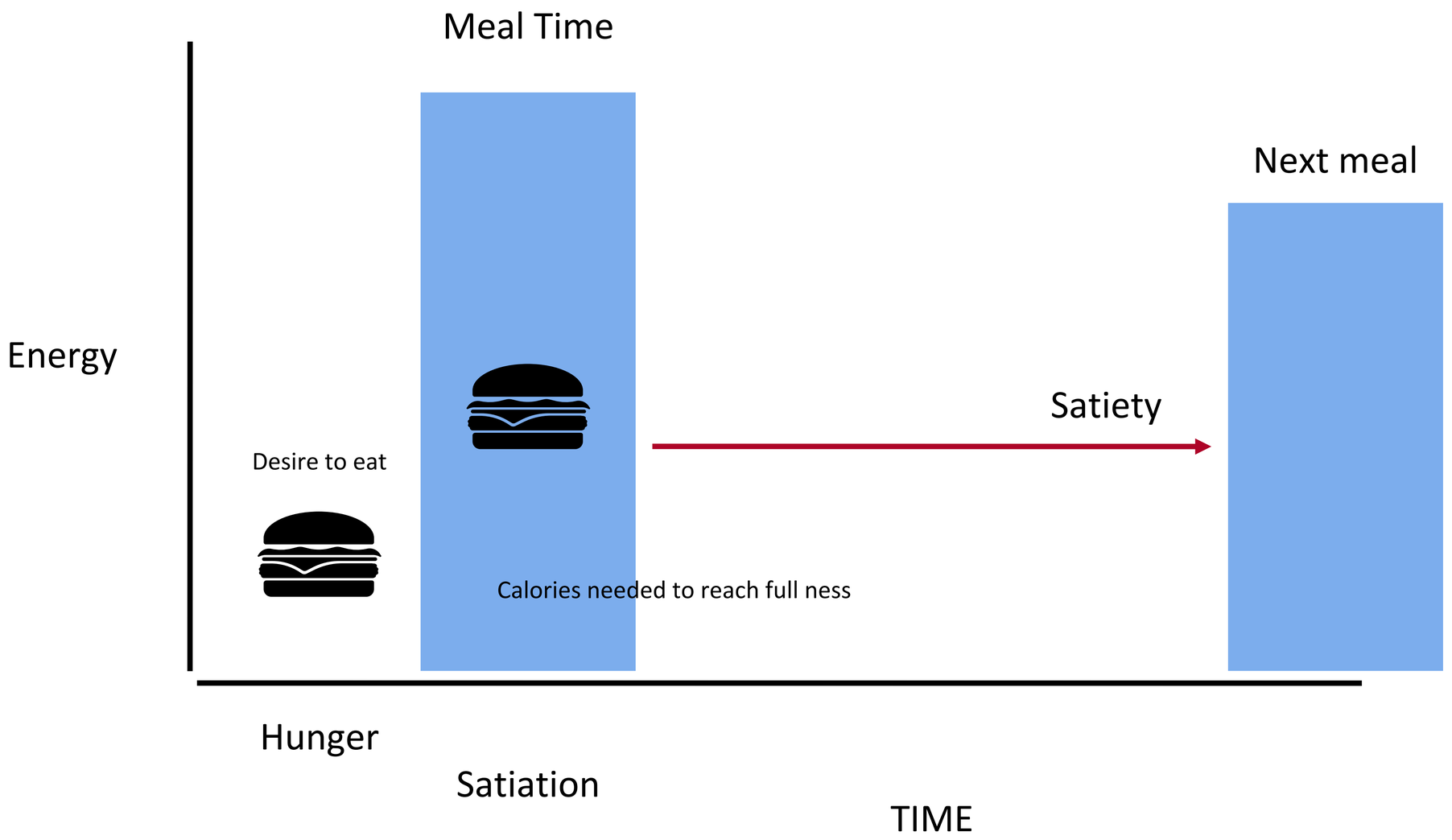
@ ravishnkr03

Disclosures



Apollo Endosurgery, USA	Consultant
Madrid International Bariatric Endoscopy Training Academy	Co-Director
Academy of Endoscopy, USA	Trainer and Treasurer

The Meal and Response



Signals

- *Sensory*
- *Cognitive*
- *Post ingestive*
- *Post absorptive*

Objectives of Endoscopic Treatment

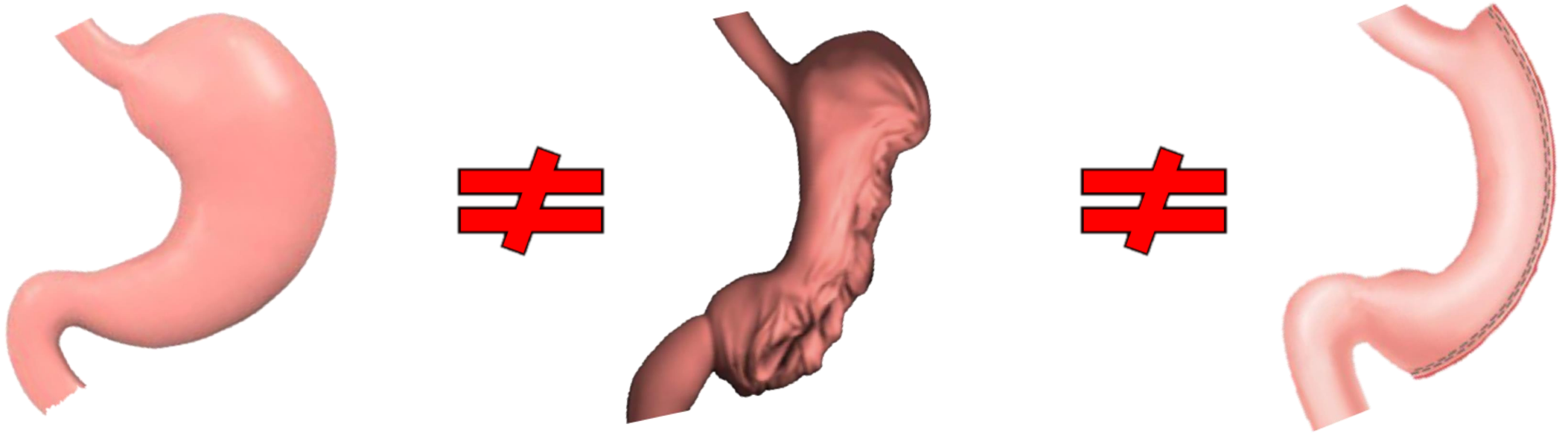
- Restrict gastric volume
- Induce satiation and prolong satiety
- Impact on gastric motility
- Perturbations in gastrointestinal hormes
- Induce significant and sustained weight loss
- Improve comorbid illnesses

Endoscopic Gastroplasty

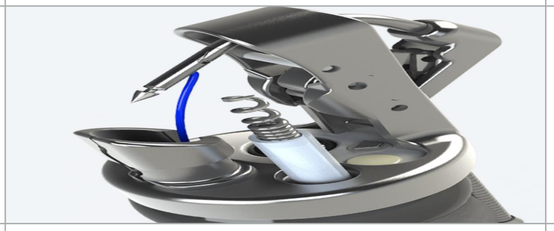
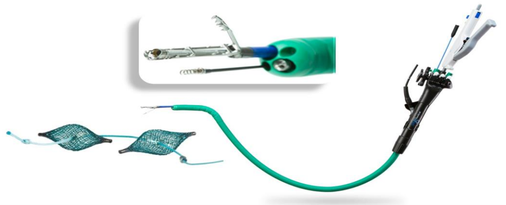
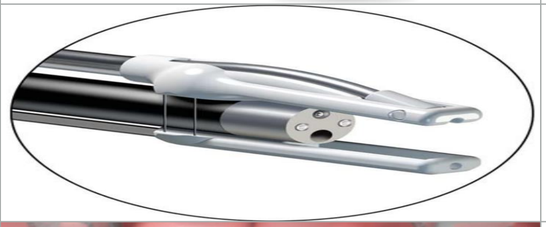
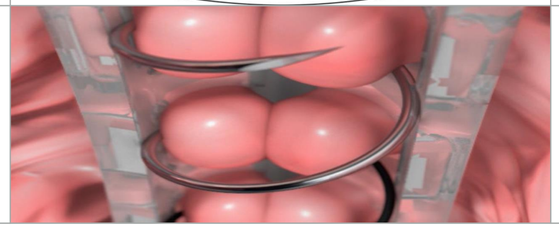
Normal Stomach

Endoscopic Gastroplasty

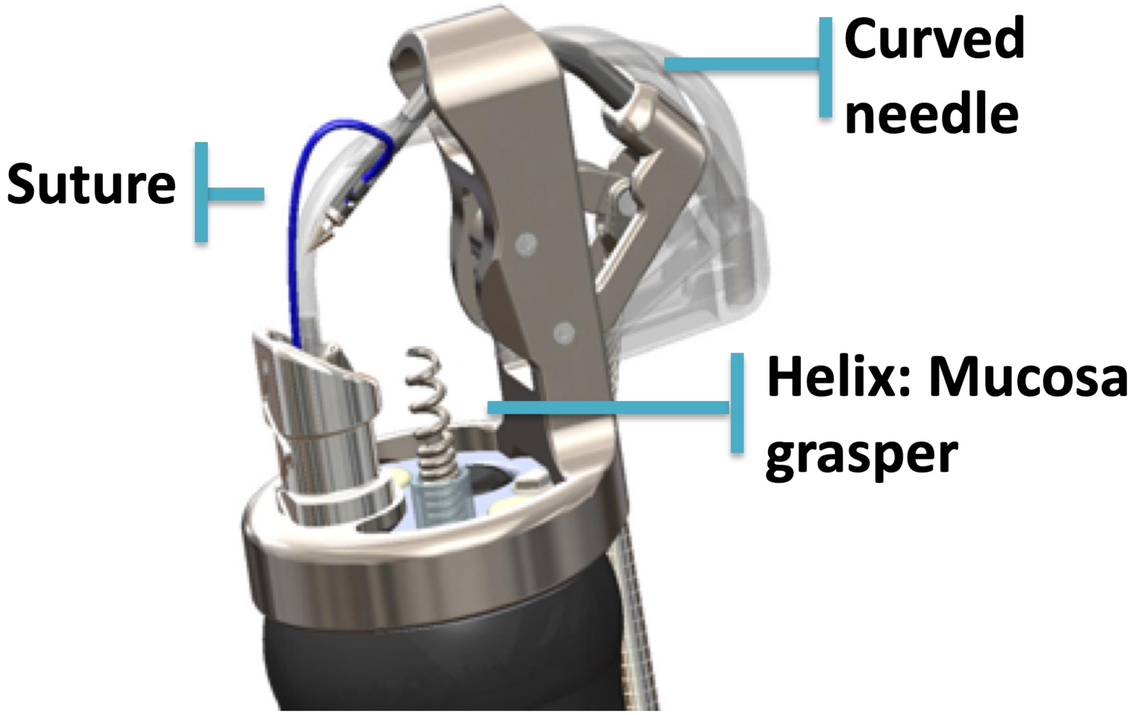
Lap Sleeve Gastrectomy

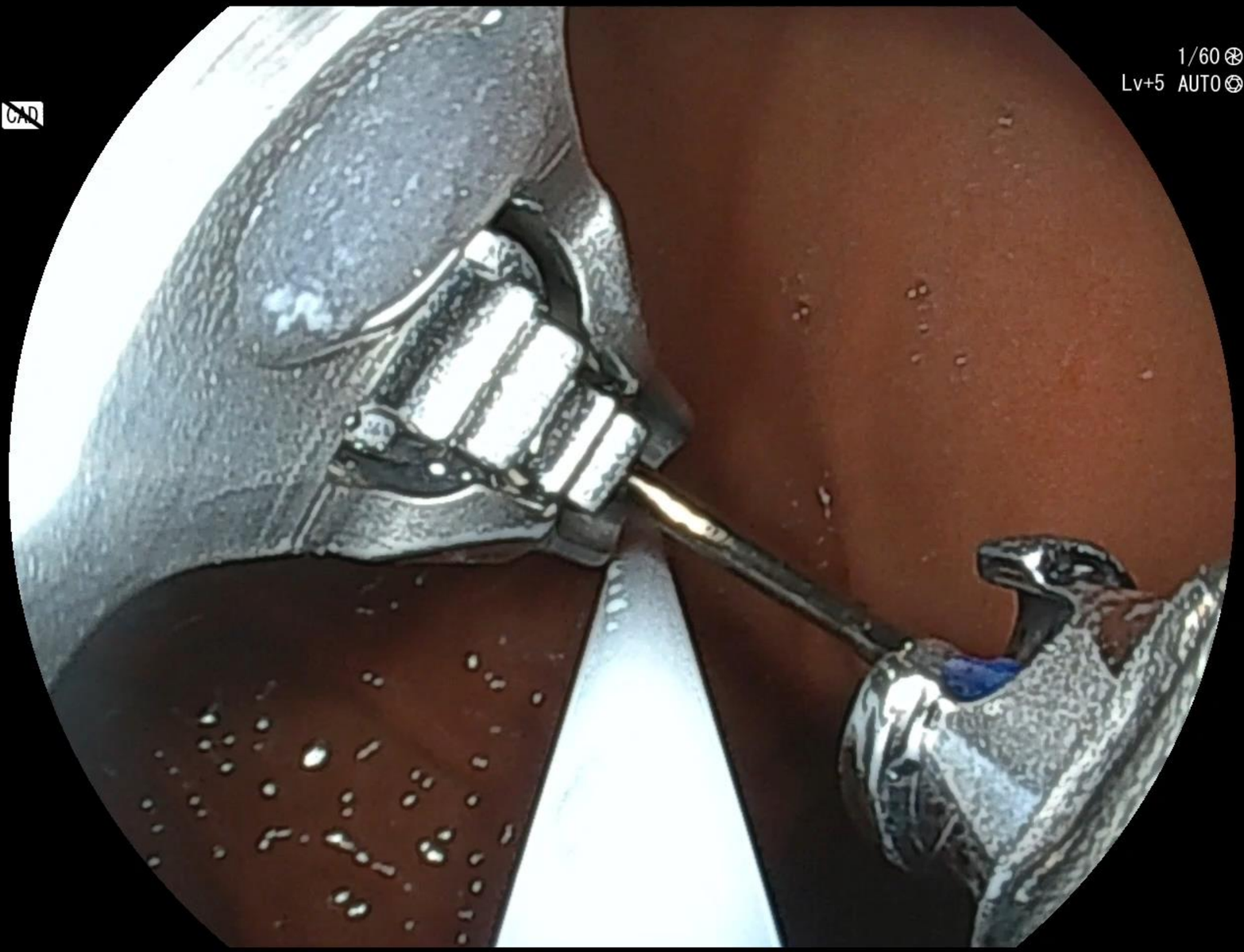


Endoscopic Gastroplasty Options

Procedure	Manufacturer	Device	Technique
Endoscopic Sleeve Gastroplasty (ESG)	Apollo Endosurgery, USA		Full thickness continuous suturing
Primary Obesity Surgery Endoluminal (POSE)	USGI Medical, USA		Tissue plication using snowshoe suture anchors
Endomina Triangulation Platform	EndoTools Therapeutics, Belgium		Transmural serosa-to-serosa apposition
Endozip	Nitinotes Surgical, Israel		Automated full thickness suturing

Endoscopic Sleeve Gastroplasty





MOV
0

HT NR

S1:FRZ
3.2
3.7
12.8 S2:LM
12.8 S3:IRIS
S4:TRIG

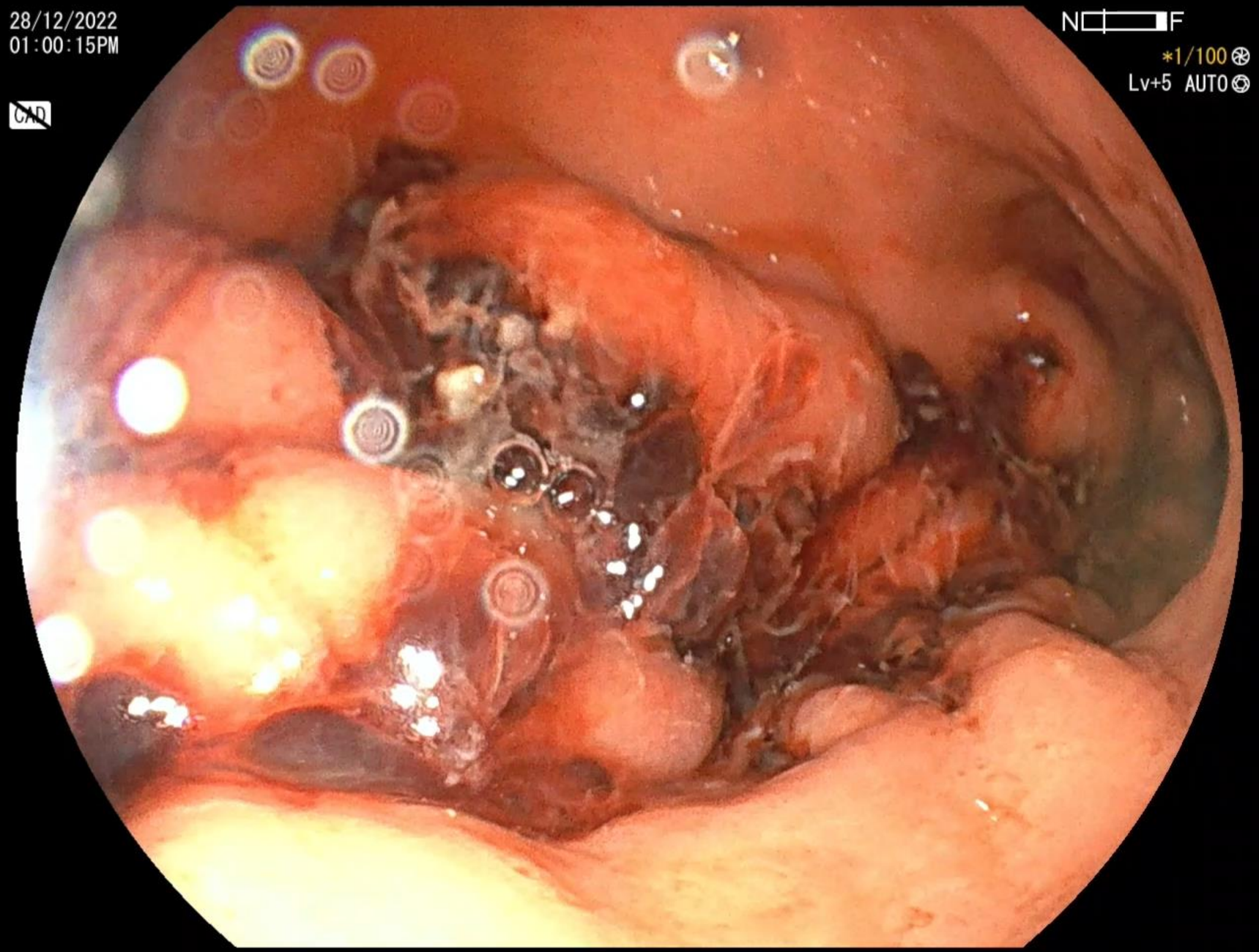
EI-740D/S

1G417K027

BL-7000

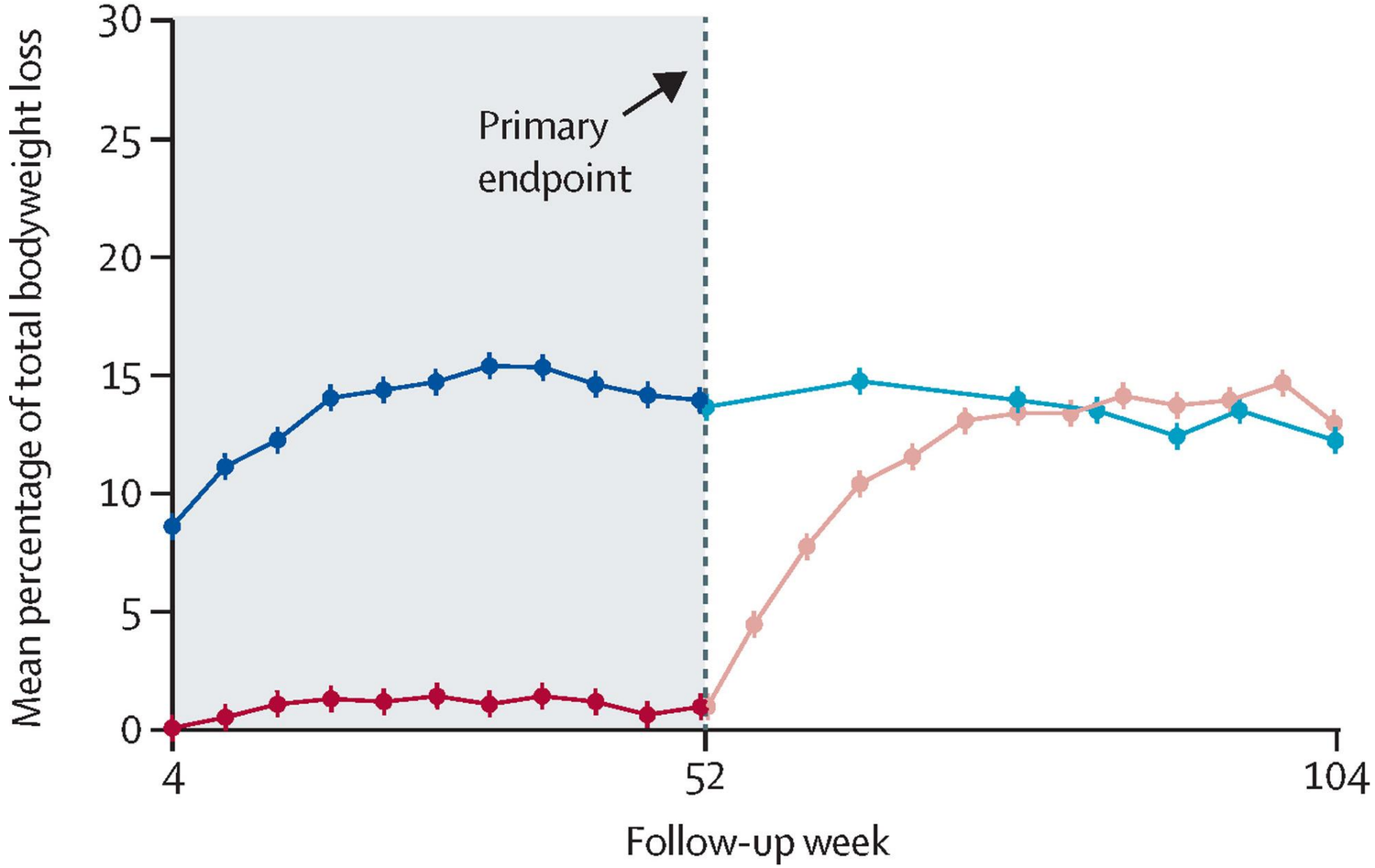
FUJIFILM

0


28/12/2022
01:00:15PM
CAD
N
F
*1/100
Lv+5 AUTO

Endoscopic sleeve gastroplasty for treatment of class 1 and 2 obesity (MERIT): a prospective, multicentre, randomised trial

THE LANCET

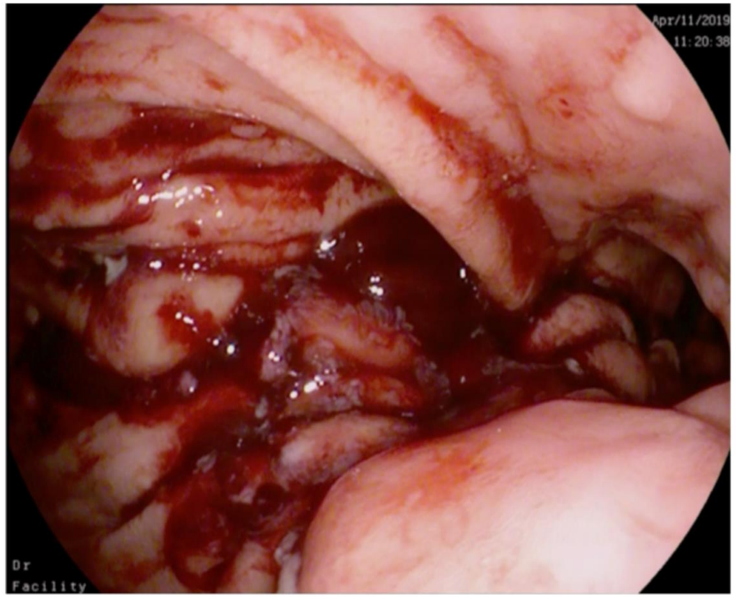


ESG =85 Control =124
%TBWL at 1 year : 13.6% vs. 0.8%
Comorbid improvement- 80%
Complications - 2%

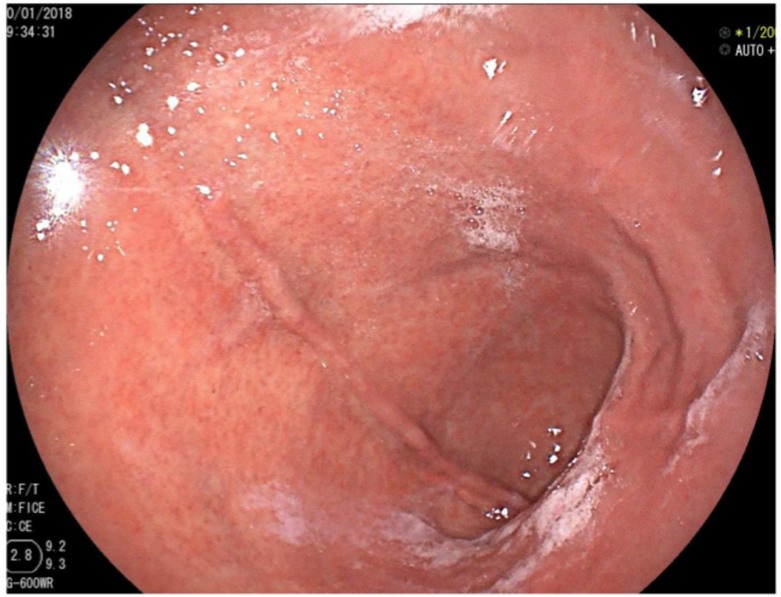
Abu Dayyeh et al 2022

ESG at 2-year

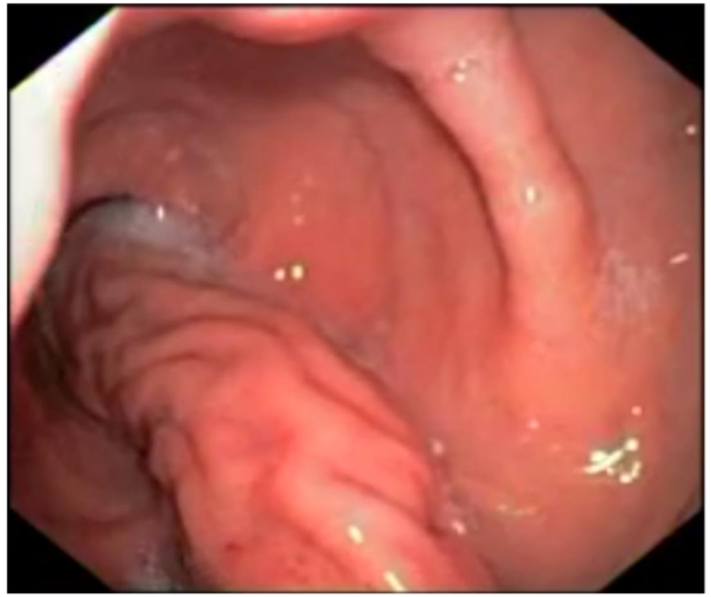
Endoscopic Sleeve Gastroplasty



Lap. Sleeve Gastrectomy



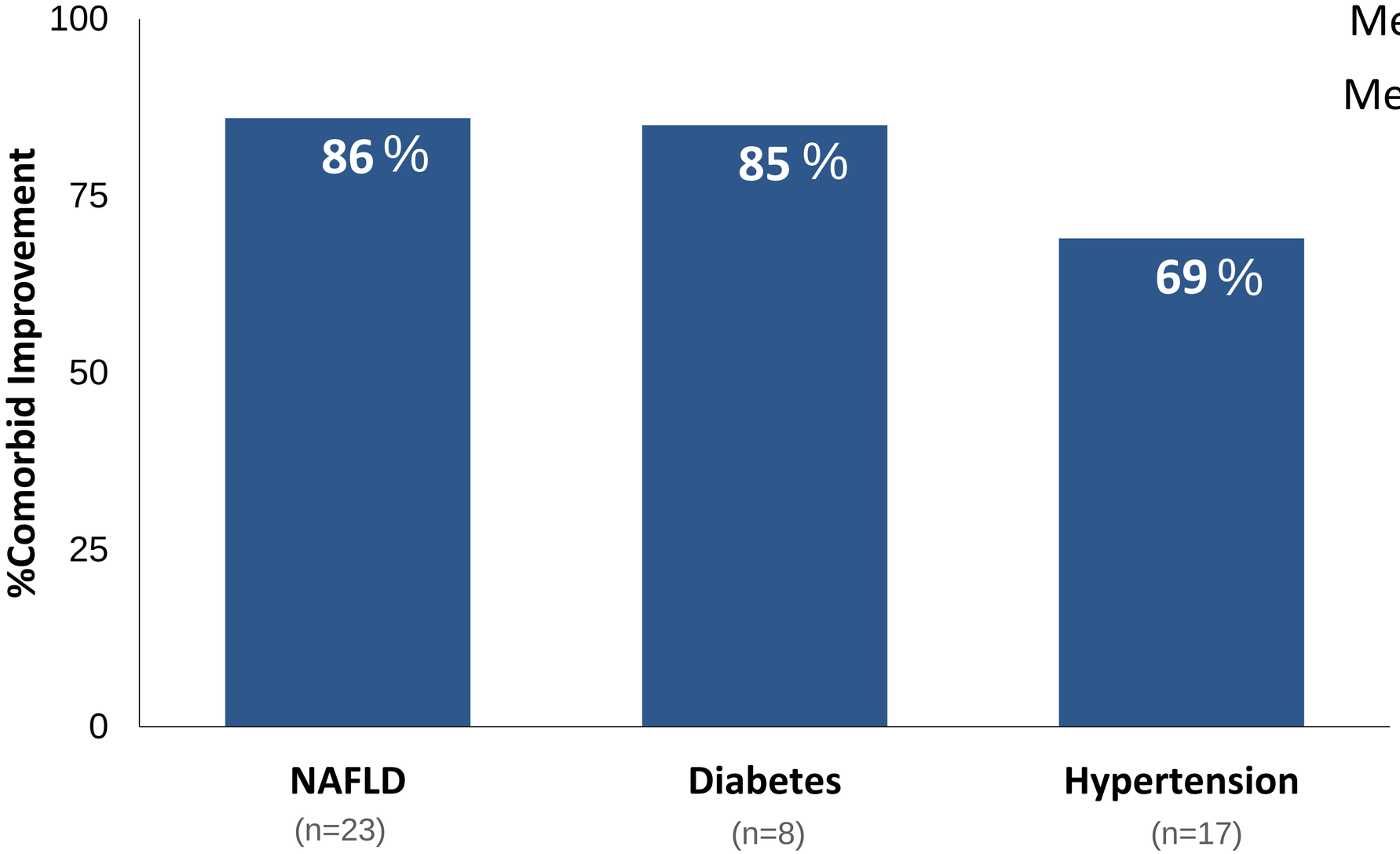
Lap. Greater Curve Plication



Procedure Time	35 min	51 min	59 min
Weight Loss	18.5%	28.3^%	26.9%
Complication rate	0.5%	4.9%	8.3%
Hospital Stay	1 day	3 day	3 day

Gontrand Lopez-Nava, Ravishankar Asokkumar et al. Endoscopy 2020

COMORBID CHANGES



Mean diff SBP: -10 mm Hg

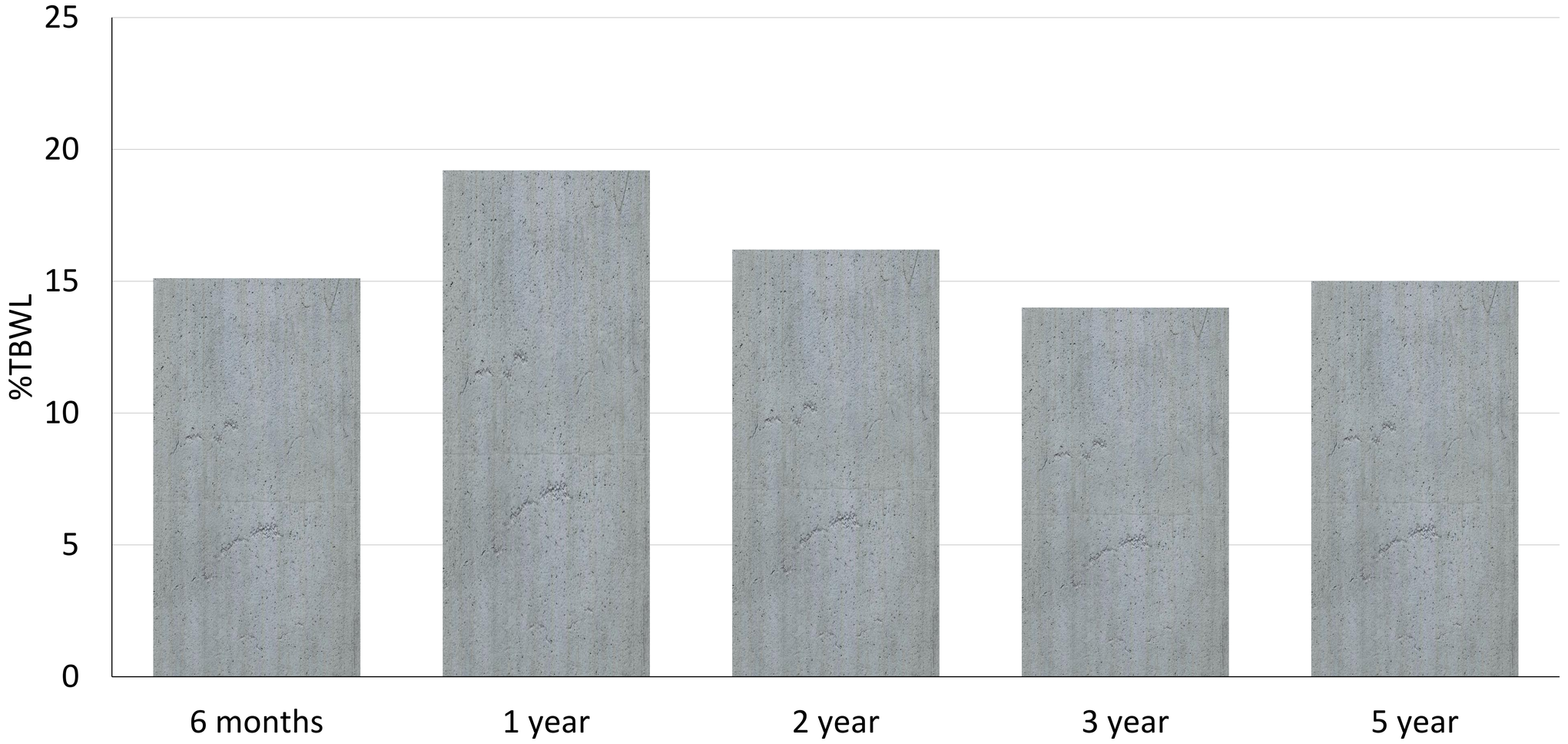
Mean diff in HbA1C: -1.3 %

ALT: 70 vs. 27 IU/ml

AST: 56 vs. 28 IU/ml

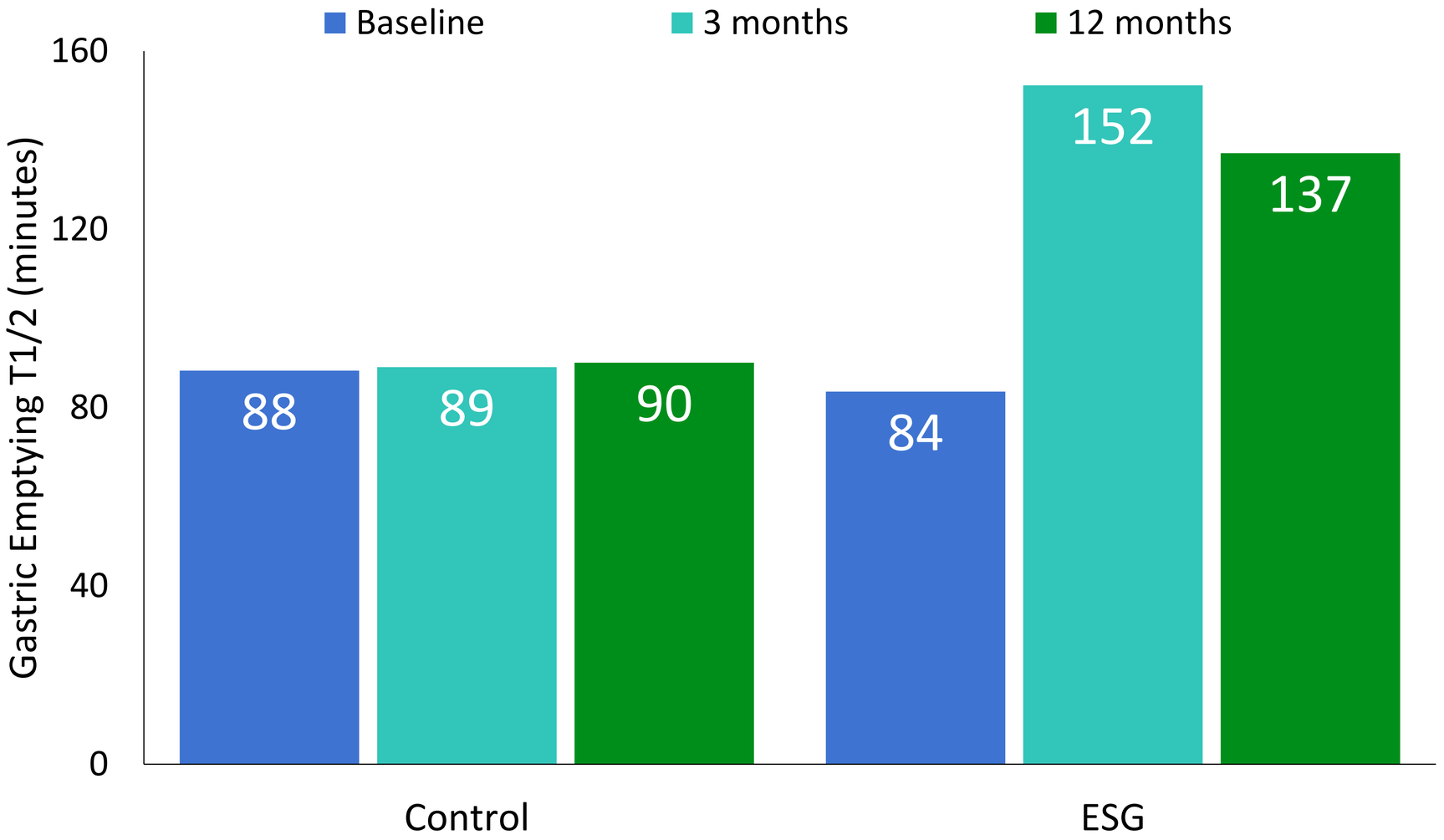
Asokkumar R et al. JGH 2021

WEIGHT LOSS SUSTAINABILITY



Sharaiha et al. CGH 2021
Alqathani et al. GIE 2022

Mechanism For Weight Loss



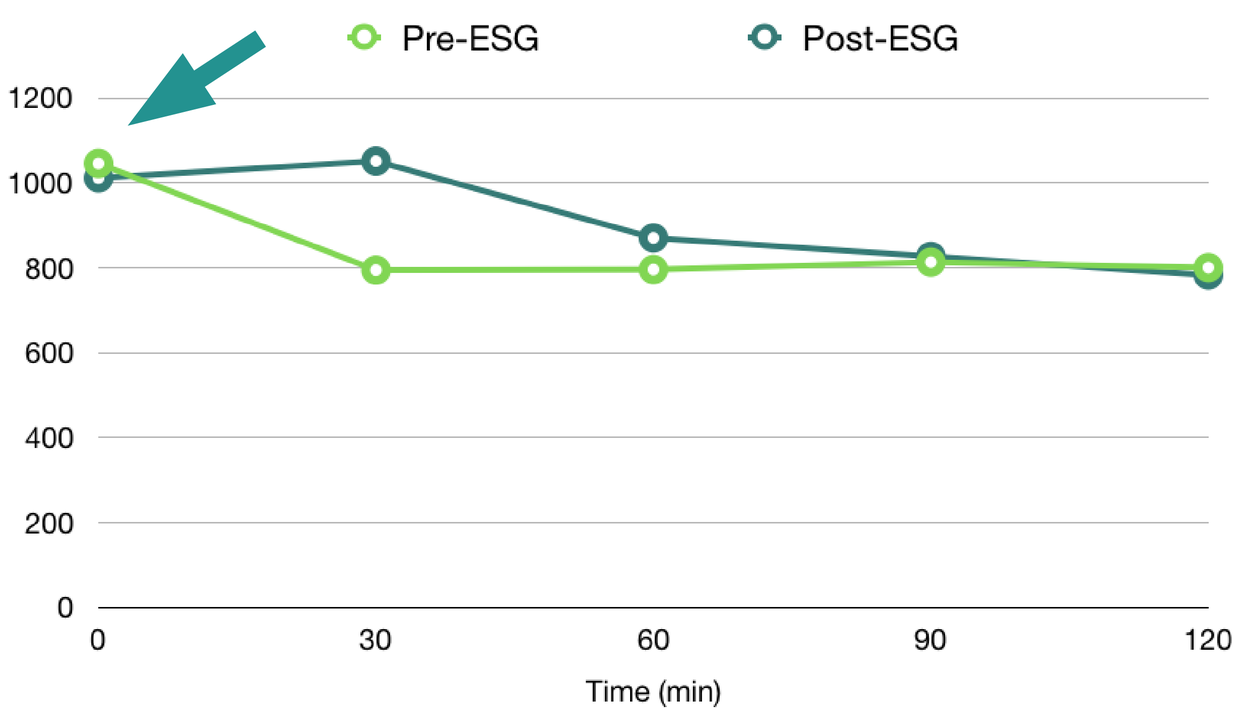
Vargas et al. Gut 2022

Hormone Changes After ESG Vs. LSG

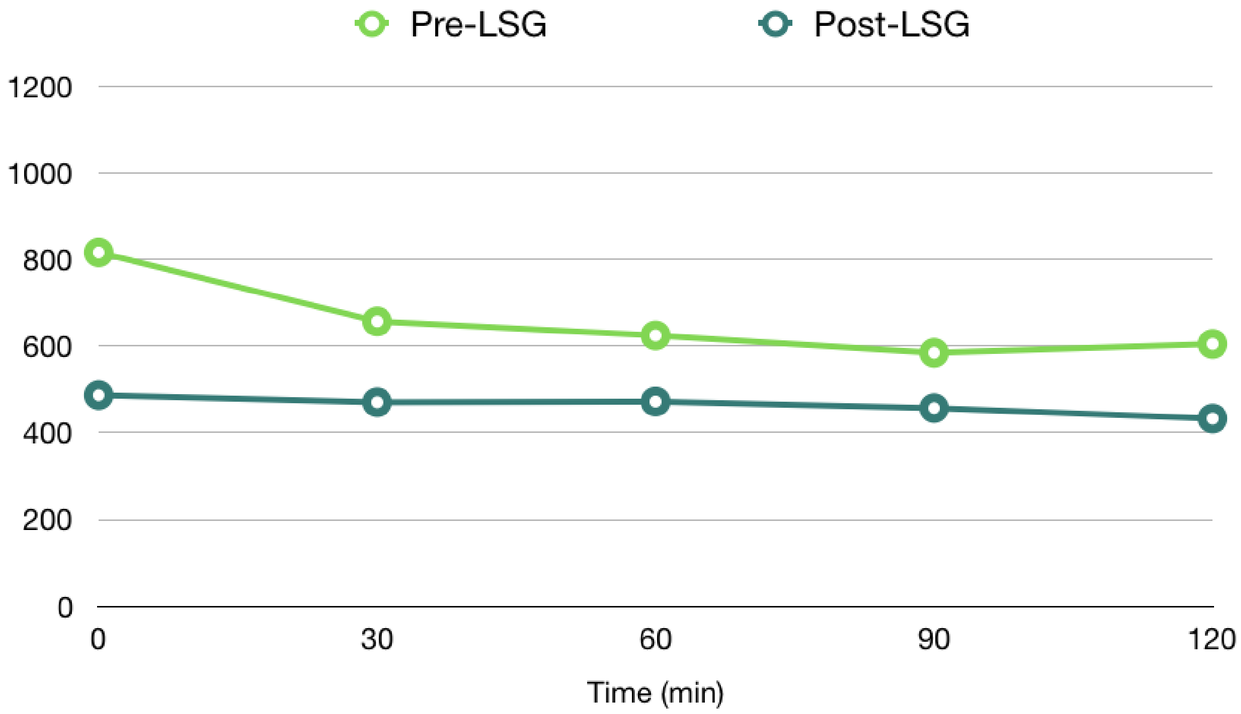
Gontrand Lopez-Nava, Anuradha Negi, Bautista-Castaño I, Miguel Rubio, Ravishankar Asokkumar *Obesity Surg 2020*

Ghrelin Changes

ESG



LSG



Impression: ESG causes less alteration in Ghrelin level prevents compensatory increase in Ghrelin after weight loss (frequently seen in Diet therapy)

Hormone Changes After ESG Vs. LSG

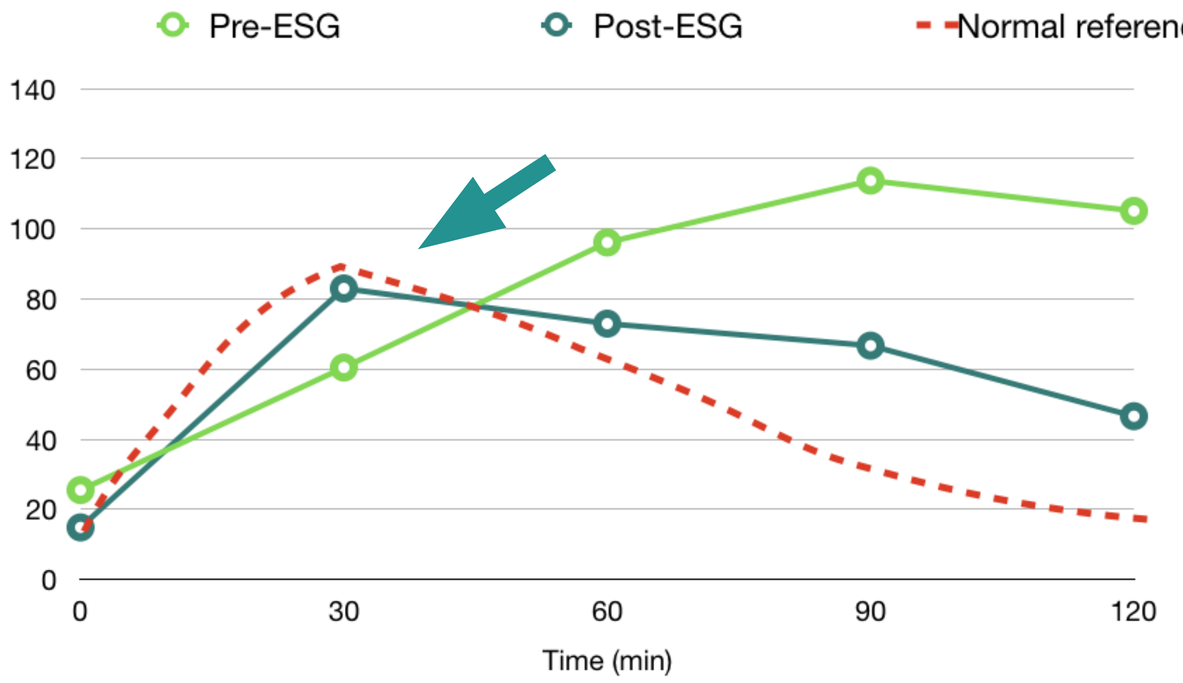
Gontrand Lopez-Nava, Anuradha Negi, Bautista-Castaño I, Miguel Rubio, Ravishankar Asokkumar

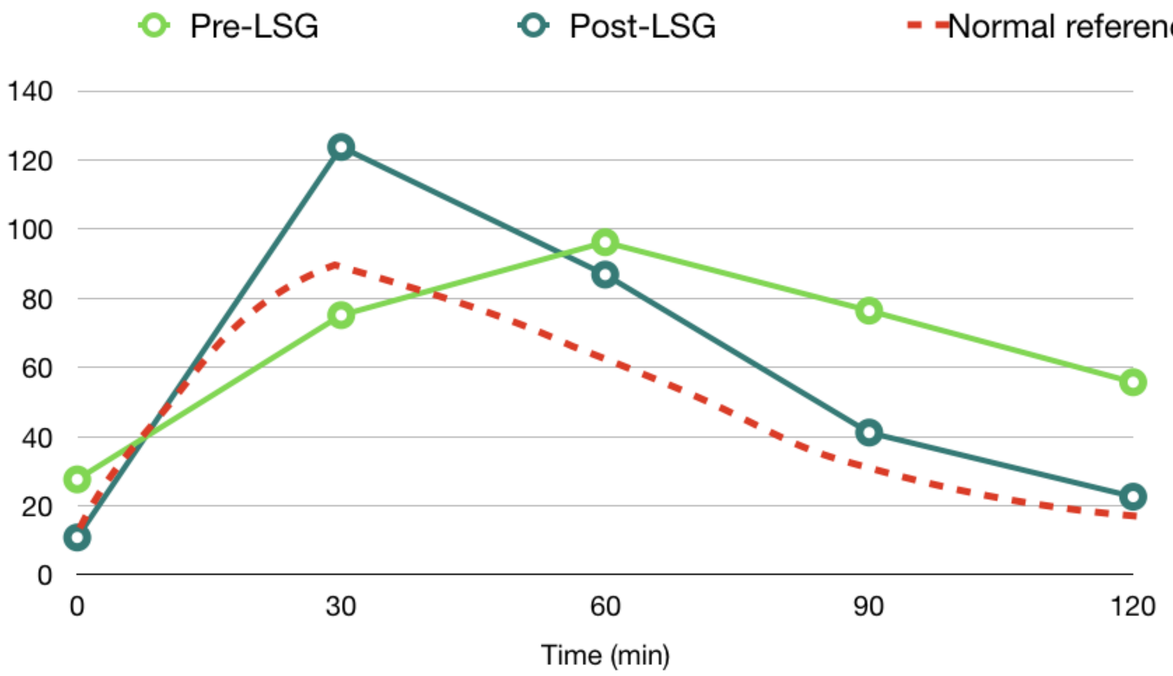
Obesity Surg 2020

ESG

Insulin Changes

LSG



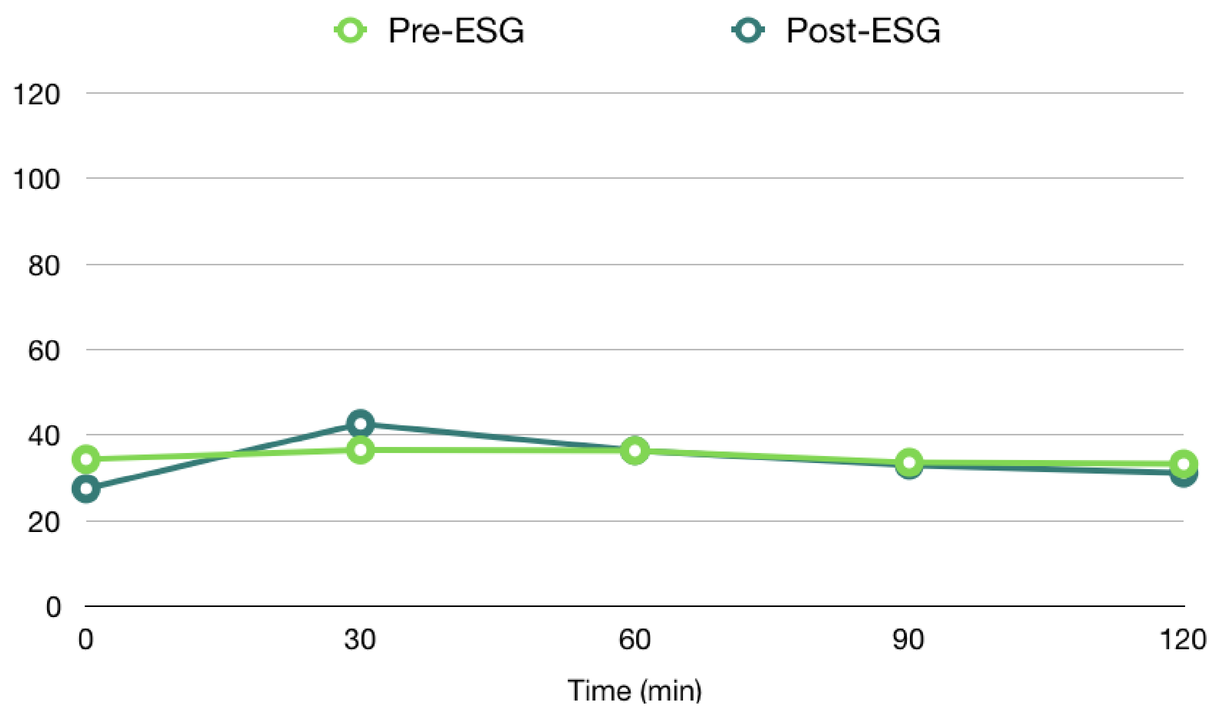


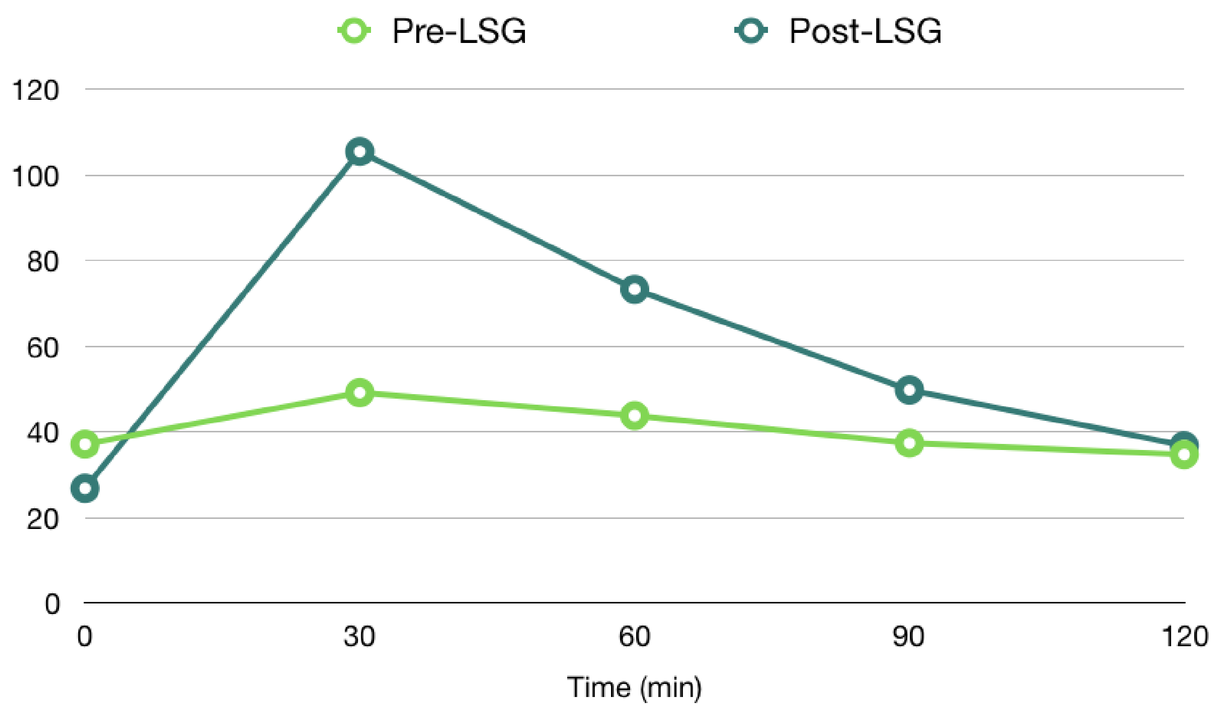
Impression: ESG improves insulin secretary profile and reduces insulin resistance.

Hormone Changes After ESG Vs. LSG

Gontrand Lopez-Nava, Anuradha Negi, Bautista-Castaño I, Miguel Rubio, Ravishankar Asokkumar *Obesity Surg 2020*

ESG GLP-1 Changes LSG

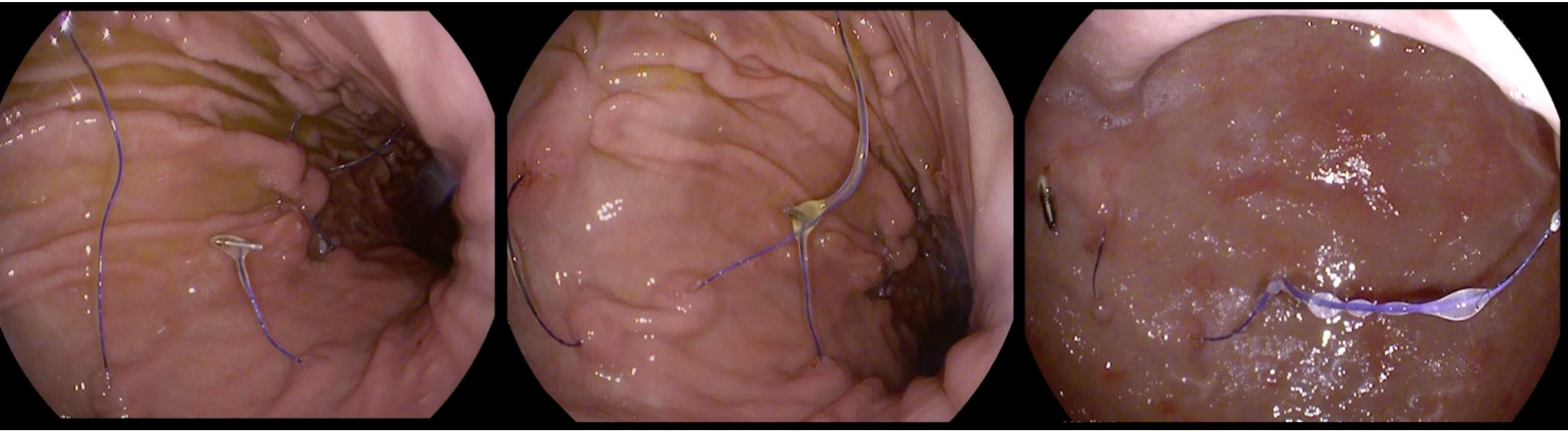




Impression: ESG does not increase incretin levels unlike LSG, suggesting delay in nutrition delivery to hindgut

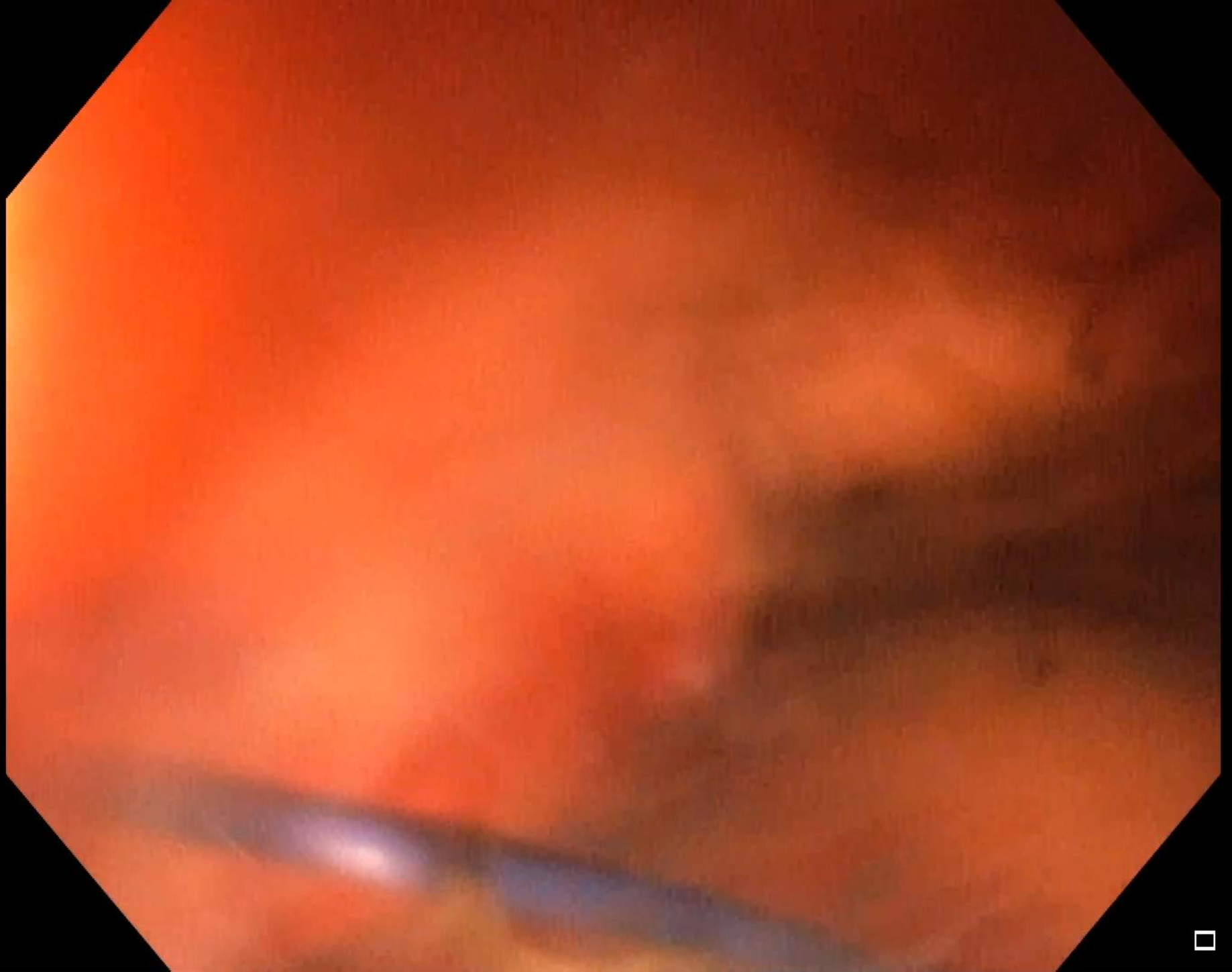
ESG and Suture Durability

12-18 months



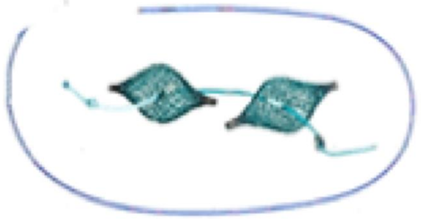
Lopez Nava, Asokkumar R et al. Surg Endoscopy 2021

Staged redo ESG
at 3 years



Primary Obesity Surgery Endoluminal (POSE)

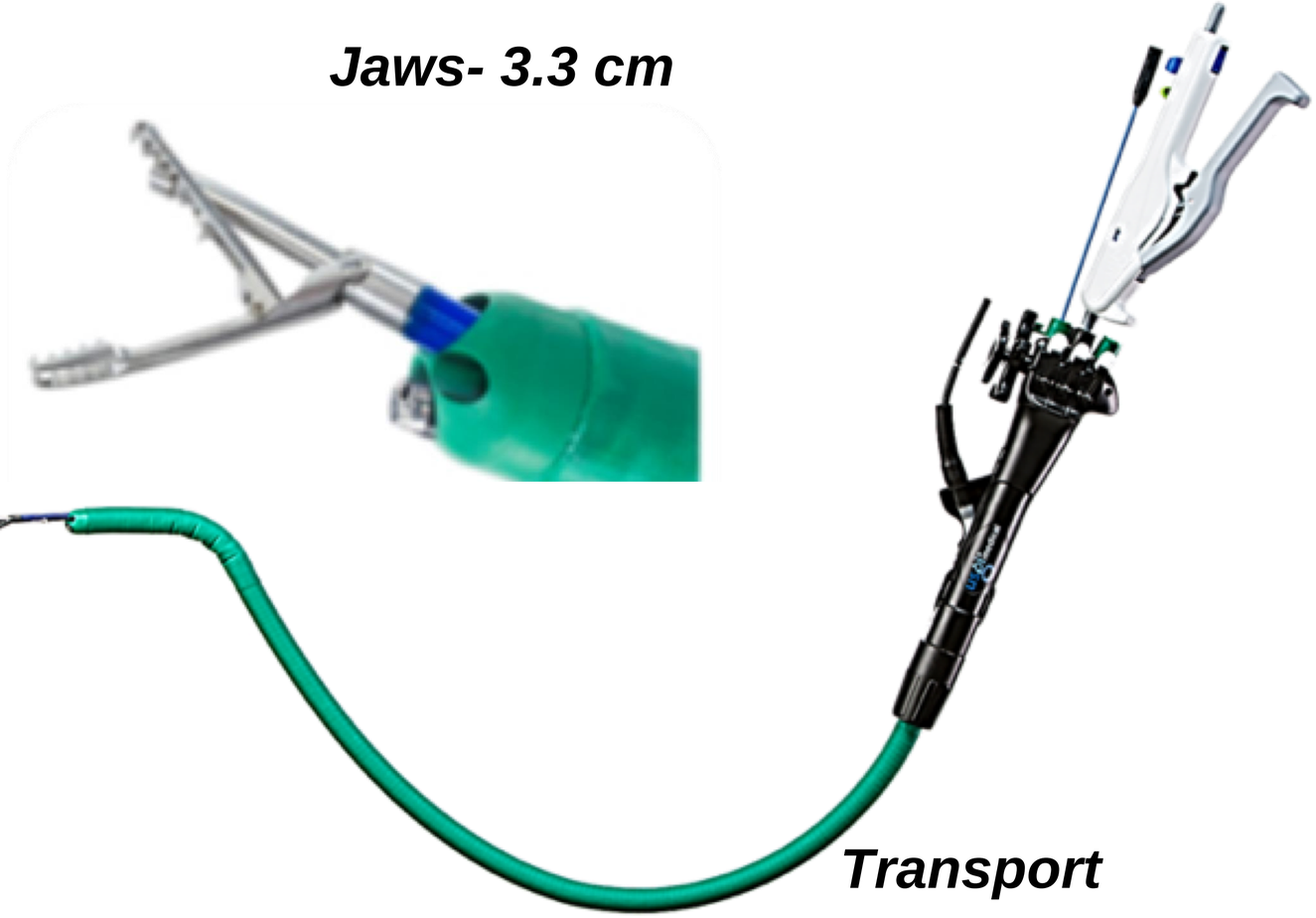
G-Prox EZ



G-Cath EZ

G-Lix

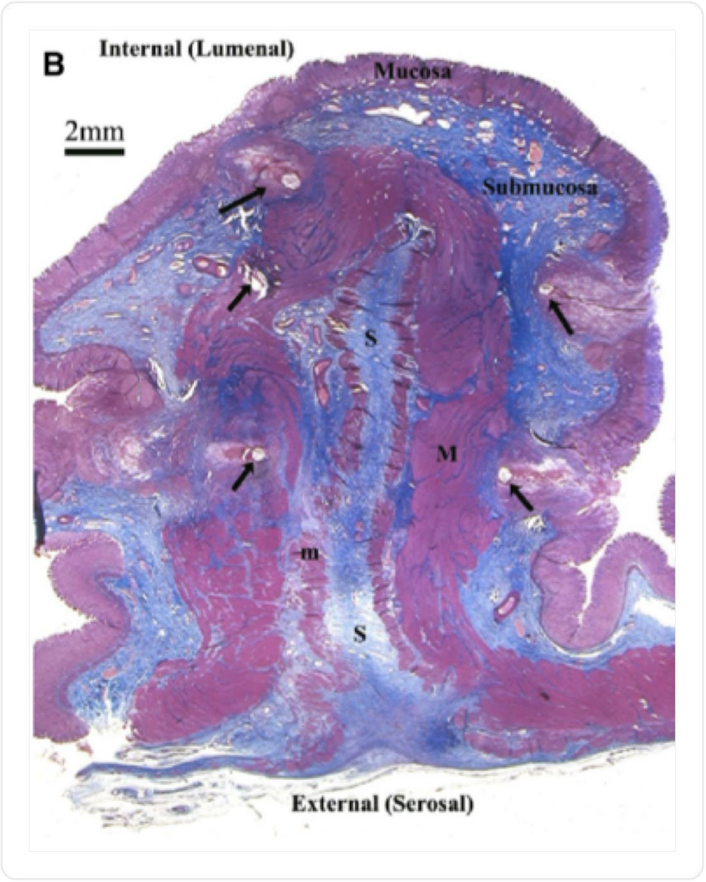
Jaws- 3.3 cm



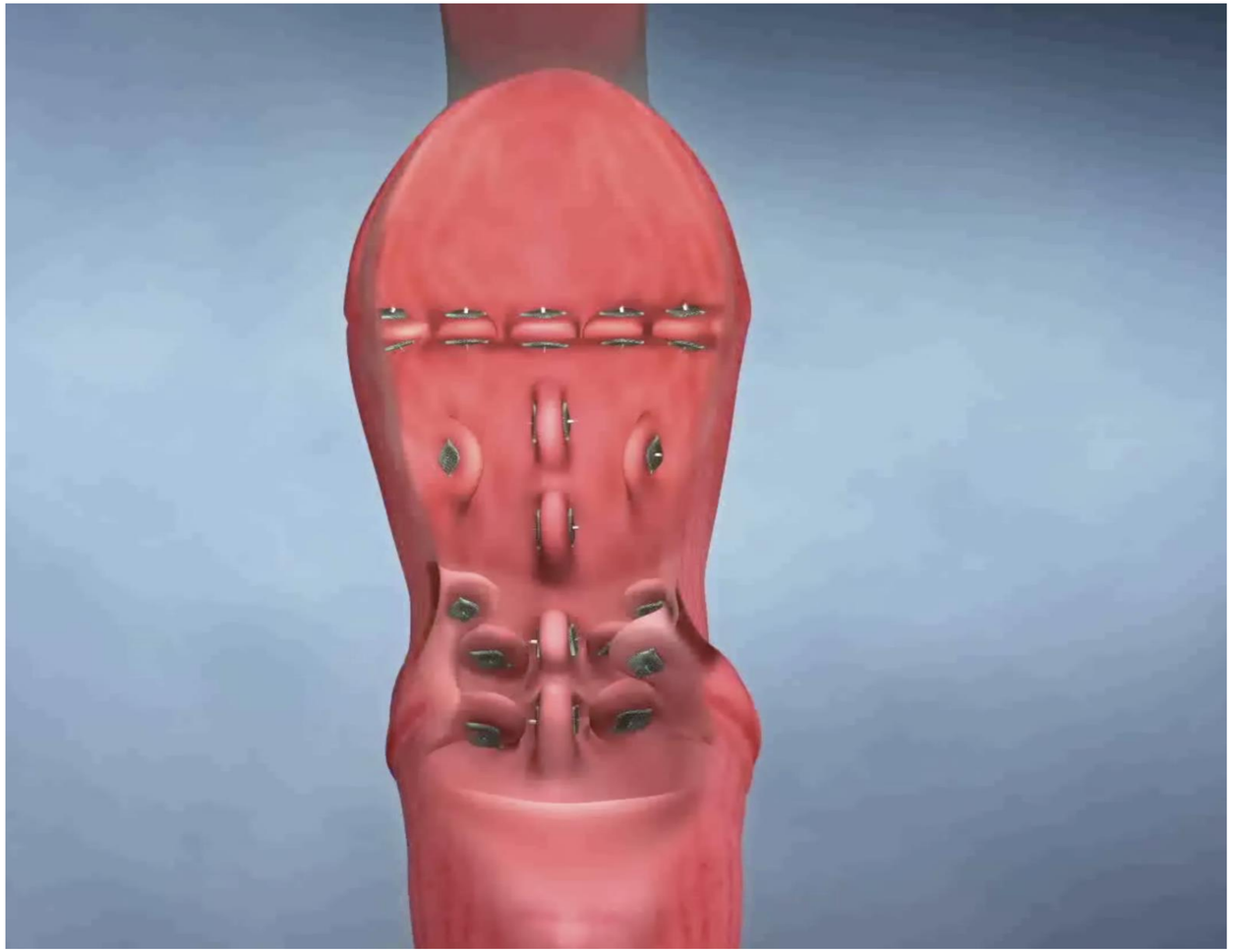
Transport

Delivery of Durable Gastroplasty

Greater Curve Plication

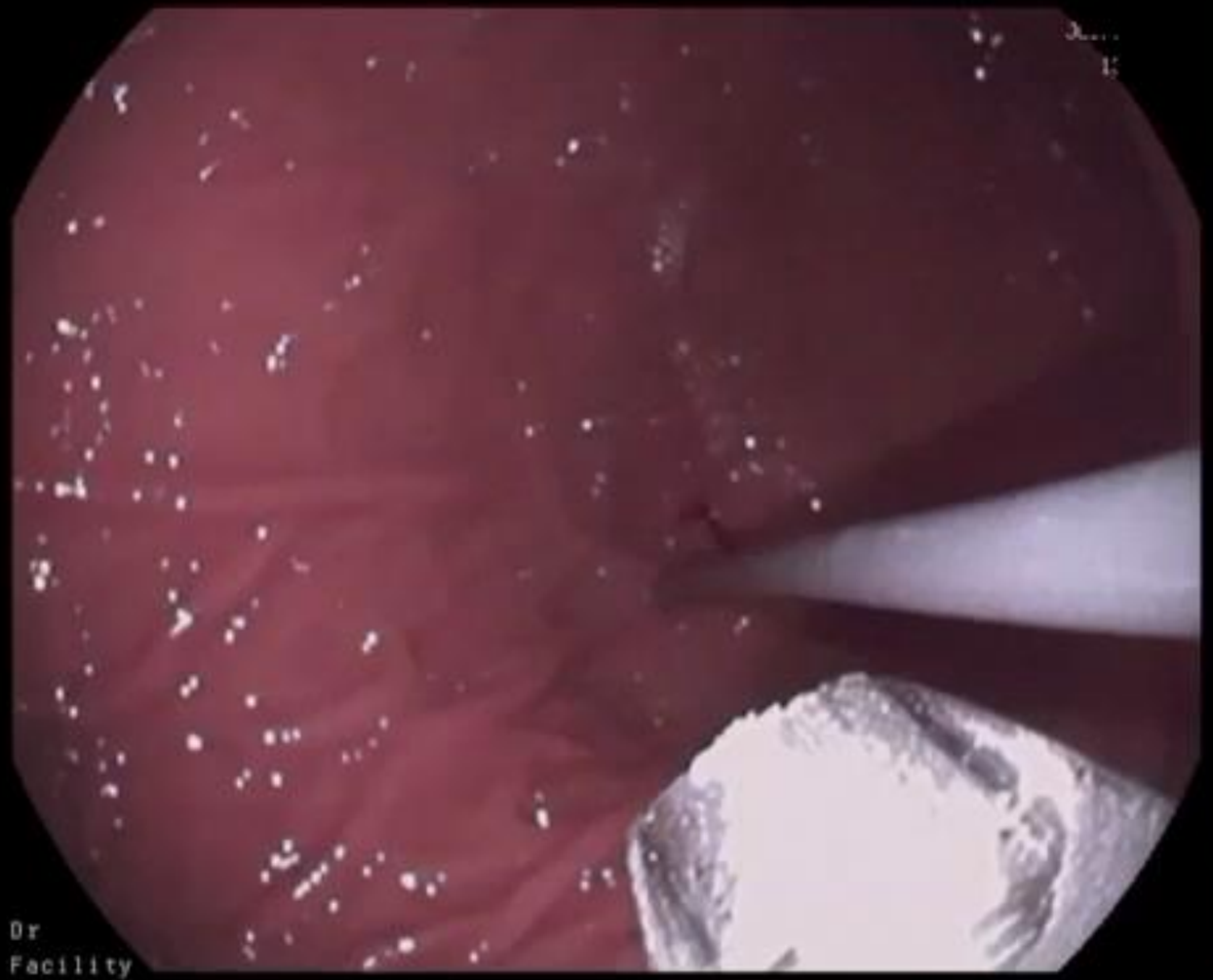


POSE 2.0- Suture Pattern



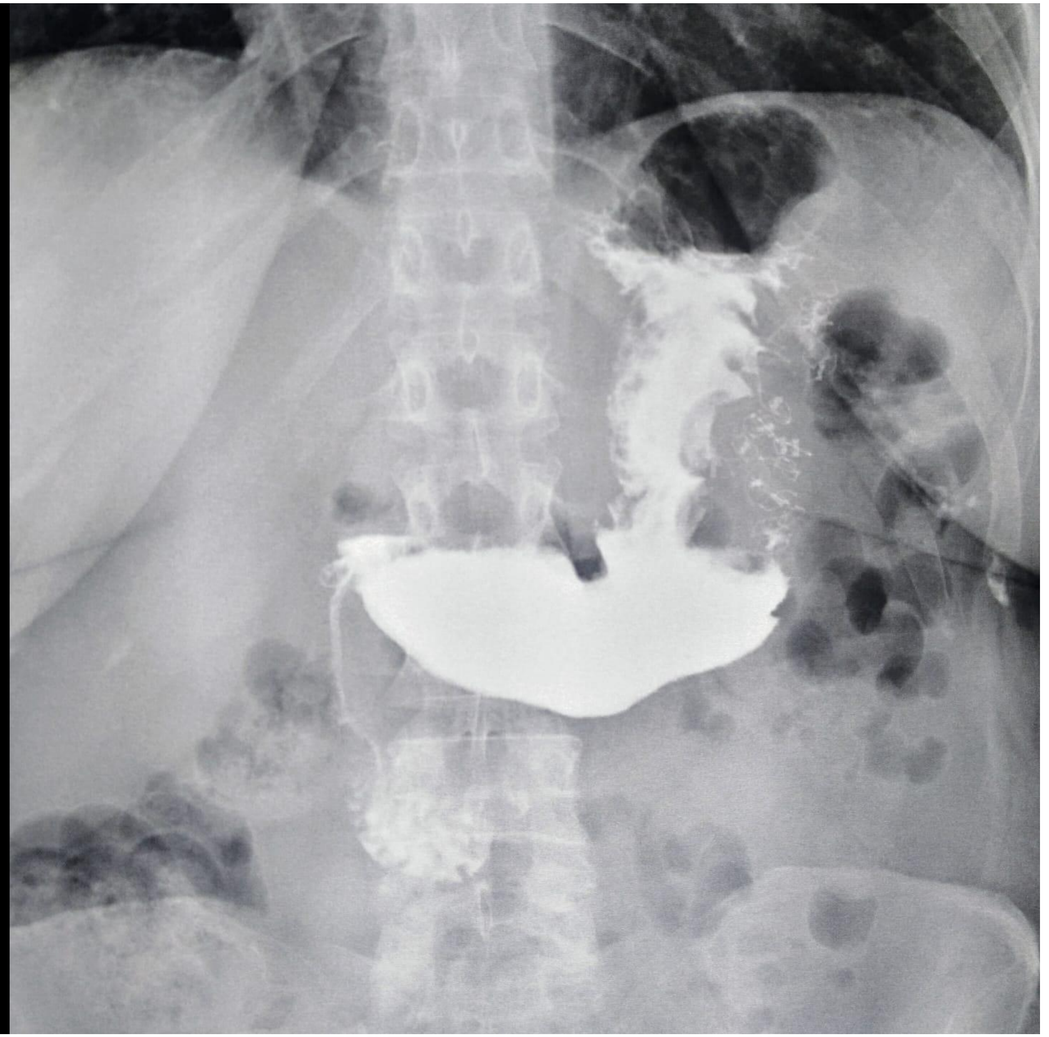
- Each plication is separate
- sutures can be individually positioned and tightened
- loss of 1-2 sutures does not usually affect the integrity
- Uses more suture material (16-18)
- More foreign material in stomach
- Needs a trained assistant and endoscopist
- Care to avoid complications

POSE-2 Procedure



Gontrand Lopez-Nava, Ravishankar Asokkumar et al. VGIE 2019

Final Stomach Appearance



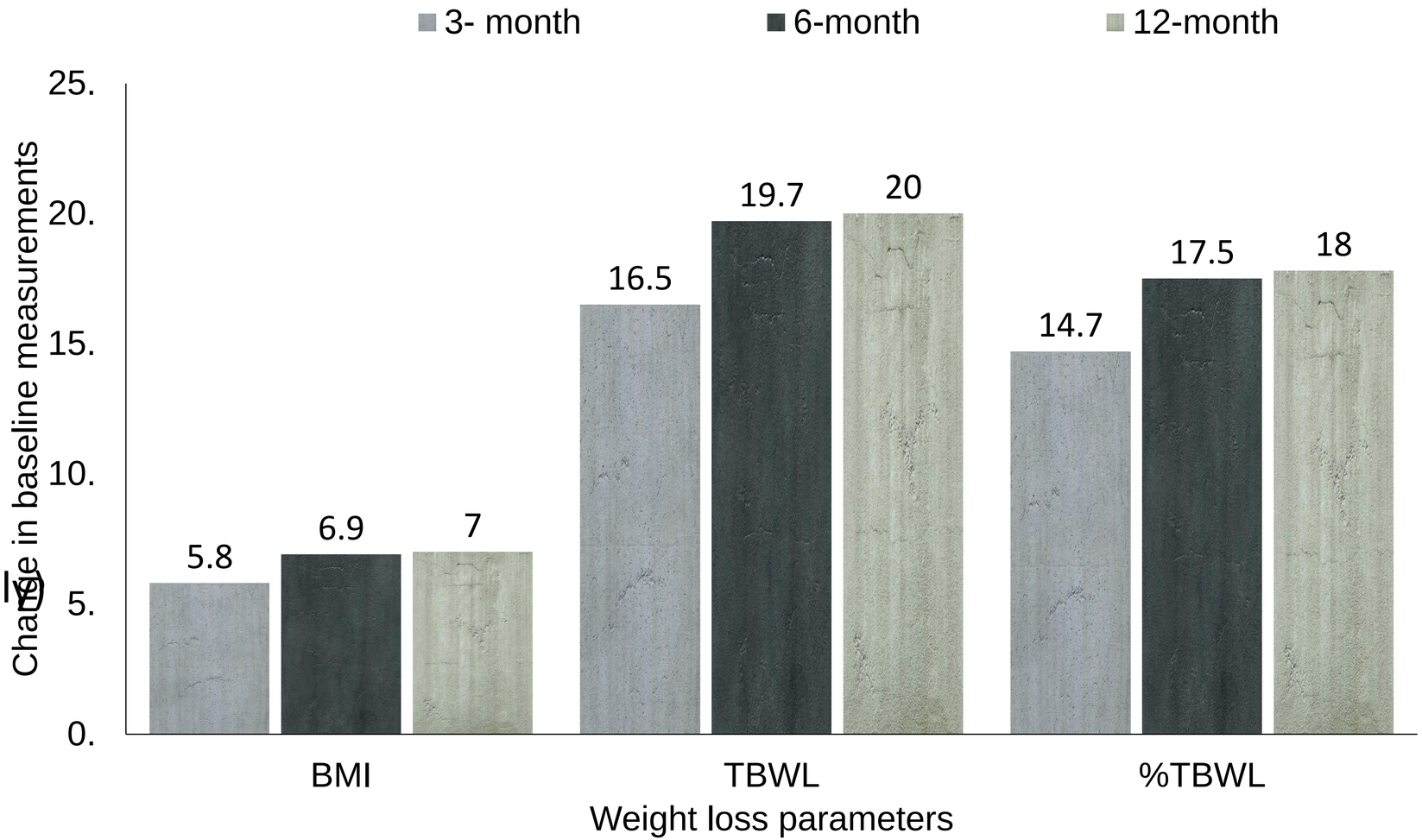
Durability

1 year

At 2 years

POSE-2 Real World Experience

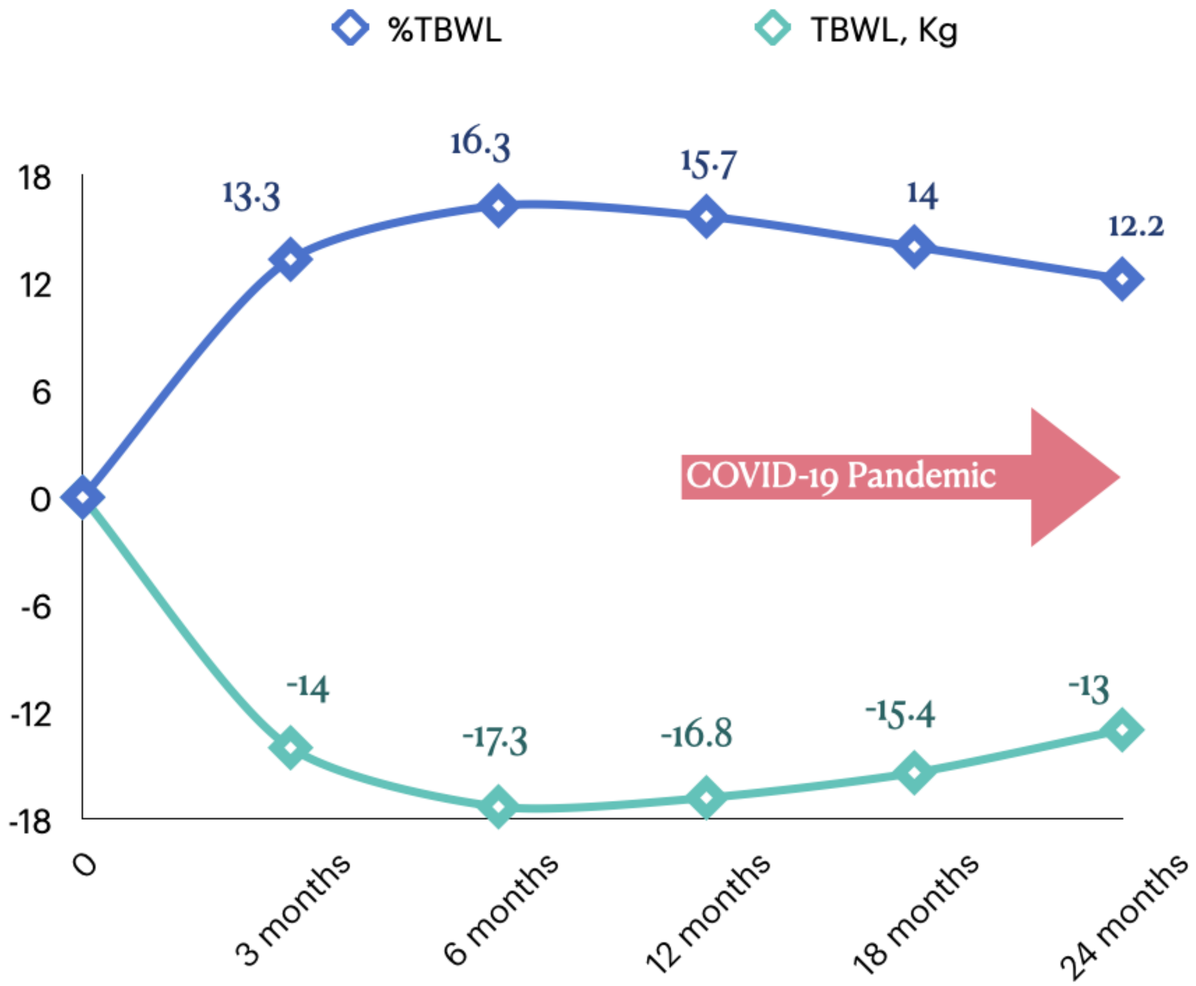
- N=83
- Mean Age = 49.3 years
- Mean BMI=38.2
- Female =67%
- Procedure time=35 min
- Plications=18
- Serious Adverse events-2
- (2 perforation- closed endoscopically)



Lopez- Nava , Asokkumar R et al. Endoscopy 2020

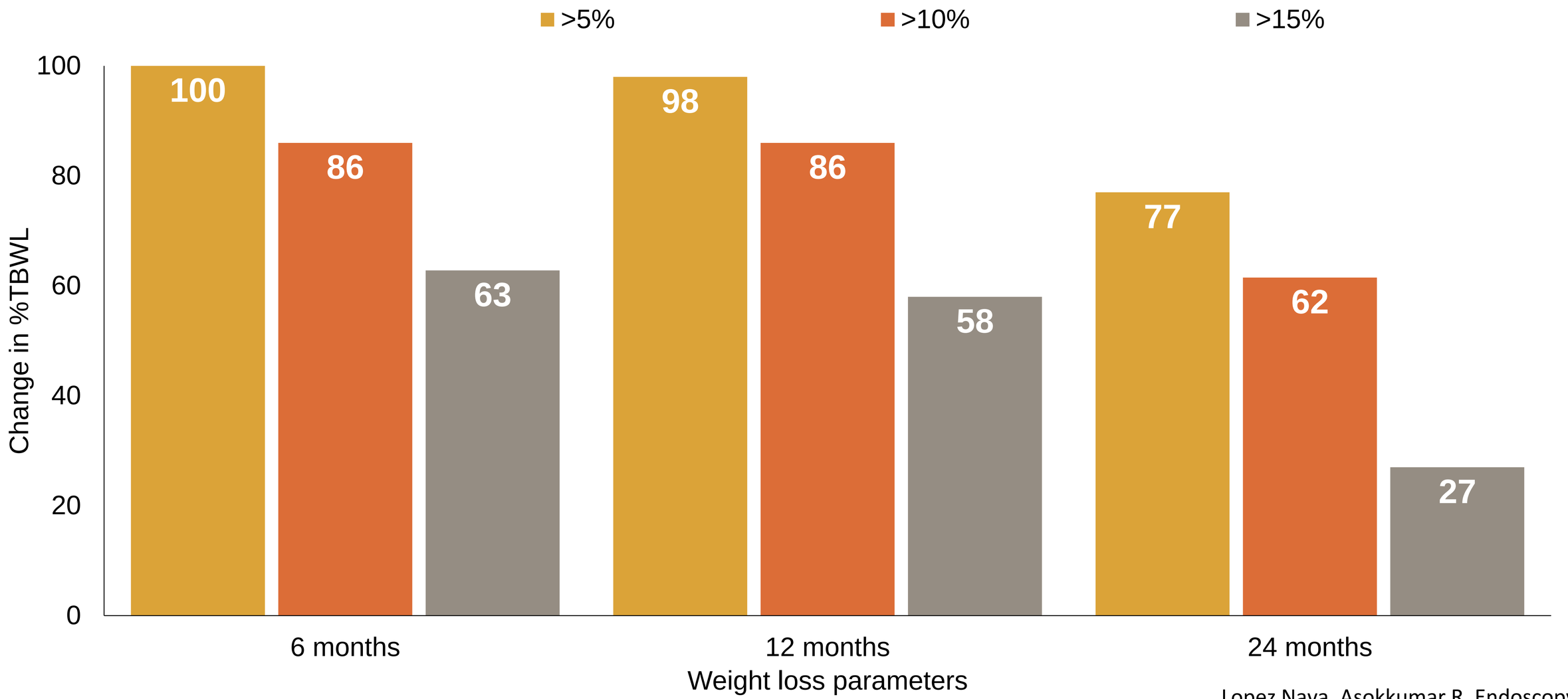
POSE 2.0 Multicenter study

- N=44
- Mean Age = 45 years
- Mean BMI=37
- Female =61%
- Procedure time=37 min
- Plications=19 (15-20)
- Adverse events-Nil



Lopez Nava, Roman T, Asokkumar R, CGH 2021

POSE 2.0 Multicenter study



Lopez Nava, Asokkumar R, Endoscopy 2020

POSE 2.0 Multicenter study

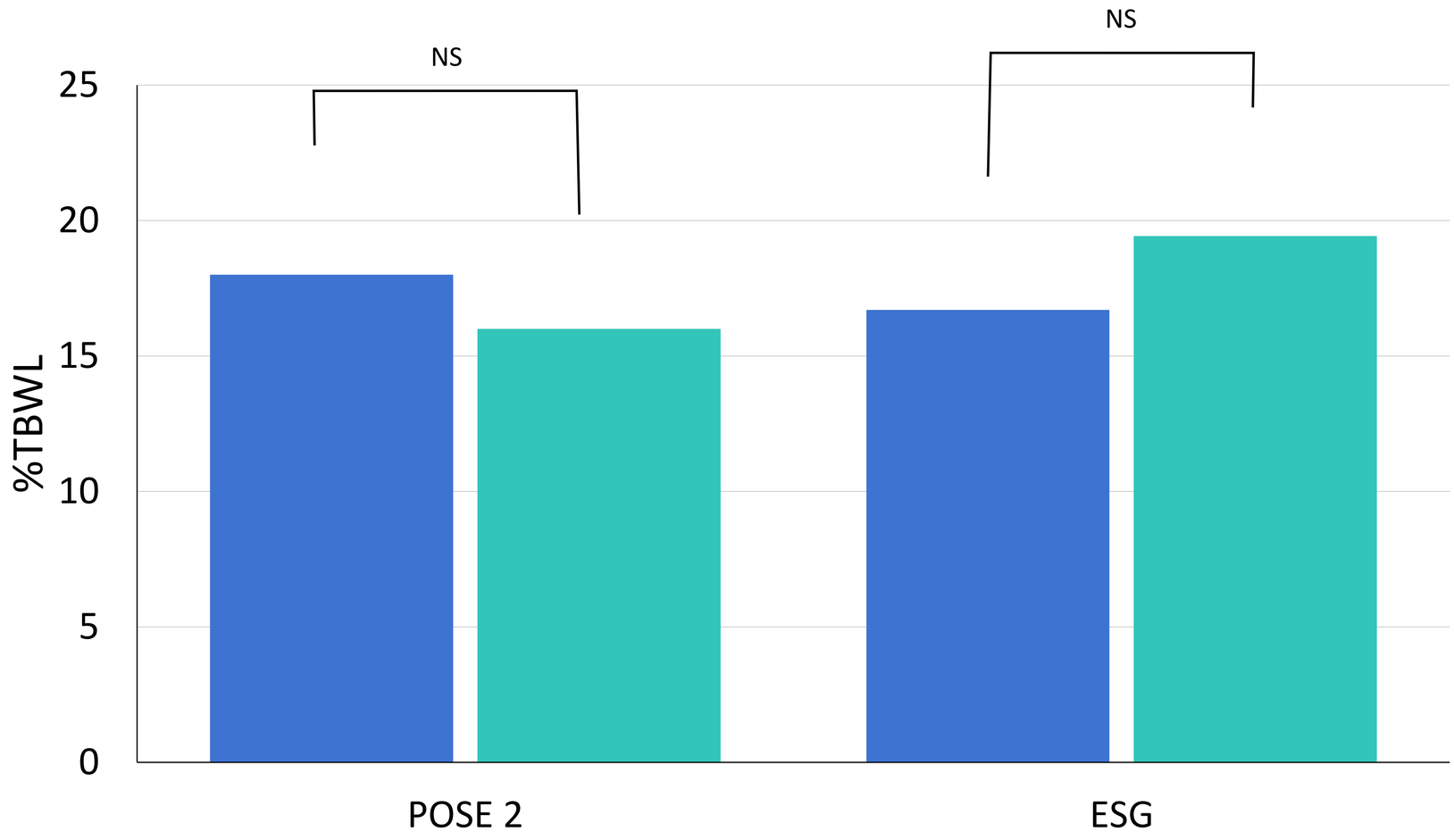
Table 3. Change in Obesity-related Comorbidities

Parameter	Baseline	6 Months	Mean difference	*P*-value
Hemoglobin A1c, %	6.5 ± 1.4	5.7 ± 0.8	-0.8	.07
Fasting glucose, *mg/dL*	109.6 ± 25.2	94.5 ± 16.7	-15.1	.07
Total cholesterol, *mg/dL*	198 ± 35	187.8 ± 43.1	-11	.03
HDL, *mg/dL*	49± 12.5	54.3 ± 12.7	+ 5	.003
LDL, *mg/dL*	123 ± 30	119.9 ± 33.7	- 4	.06
Triglycerides, *mg/dL*	131.5 ± 66	83.6 ± 31.6	-47	< .001
ALT, *U/L*	32.4 ± 29	18.5 ± 5.3	-14	.005
AST, *U/L*	25 ± 14	19.8 ± 11.8	-4.8	.09
Alkaline phosphatase	78.7 ± 24.6	75.26 ± 21.17	-2.4	.81
Platelets, × 10^3/*mL*	283.0 ± 67.1	279.0 ± 76.3	-4.0	.48
CAP, *dB/m* (n = 17)	288 ± 61	220.3 ± 33.63	-74	< .001
S0/1	29%	87.5%		
S2	6%	12.5%		
S3	6%	0%		
S4	59%	0%		
Liver elastography, *kPa* (n = 15)	5.85 ± 2.6	5.28 ± 2.39	-0.5	.09

Lopez Nava, Asokkumar R, Endoscopy 2020

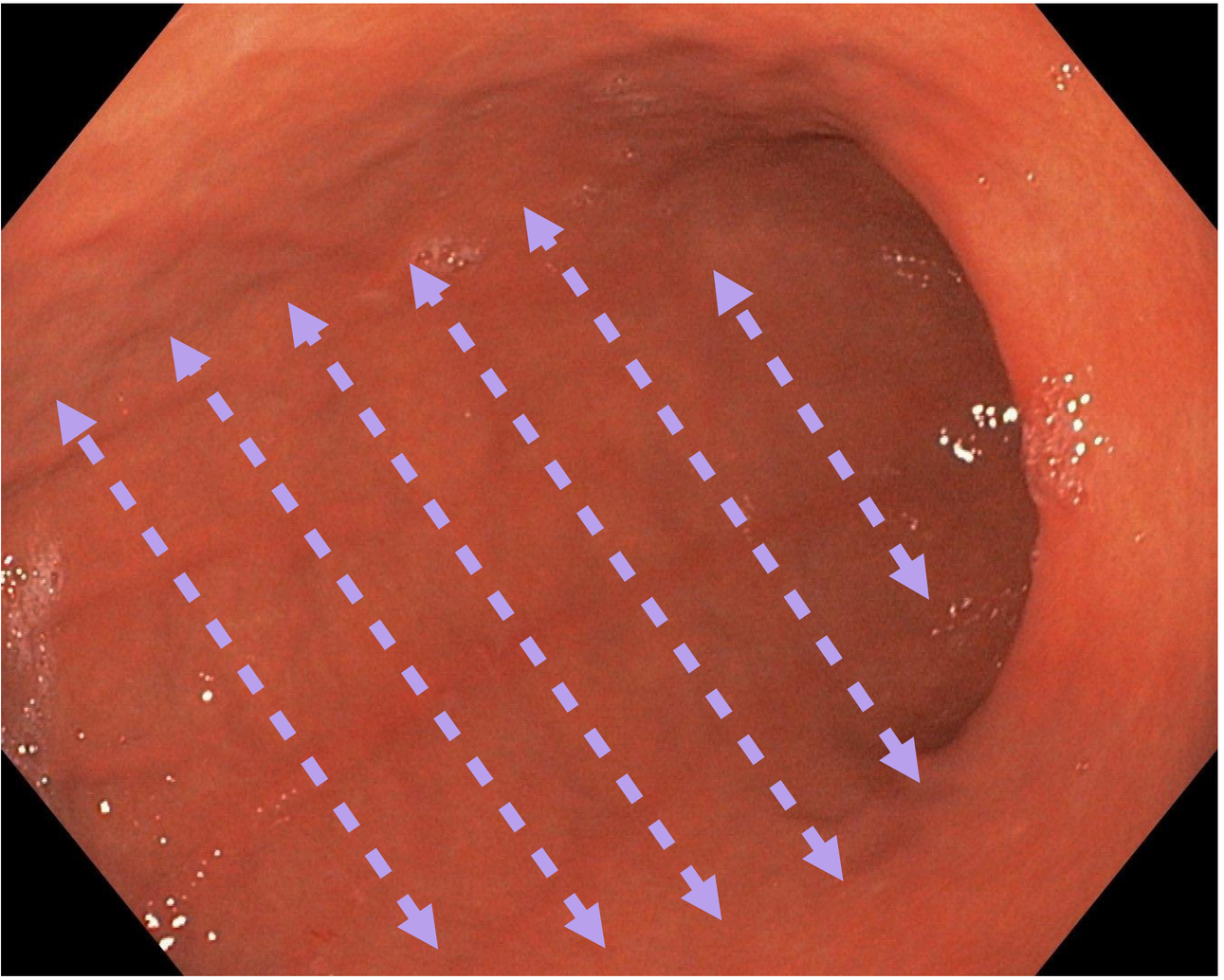
POSE 2.0 vs. ESG

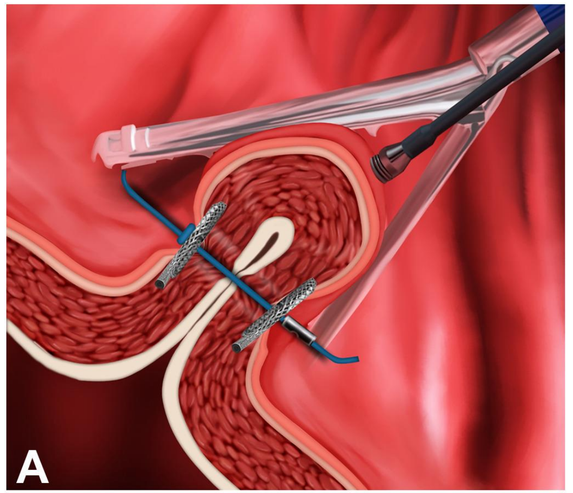
- Matched (1:3) cohort
- POSE -54 ESG -162
- Mean Age 47 years
- Mean BMI 38.5

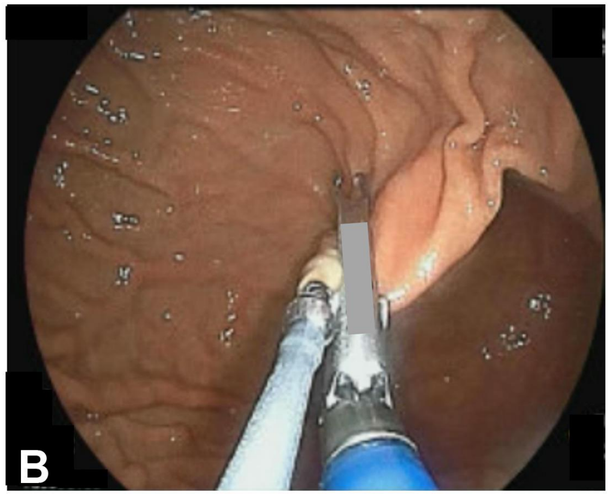


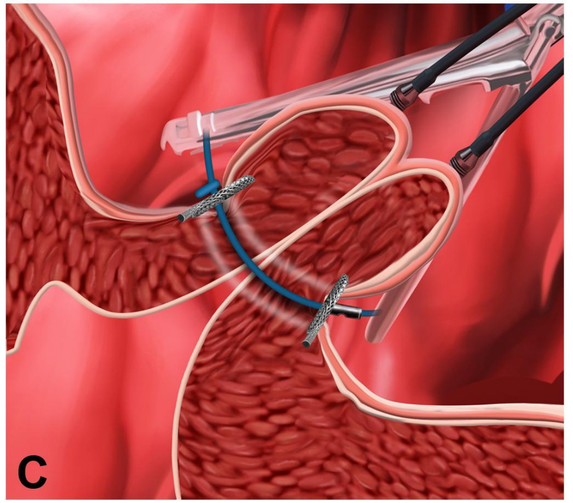
Asokkumar , Lopez Nava et al. DDW 2021

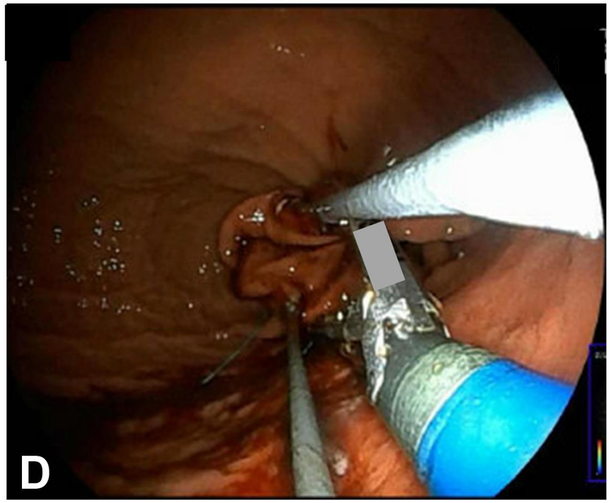
Reduce Plications- Dual Helix POSE 2



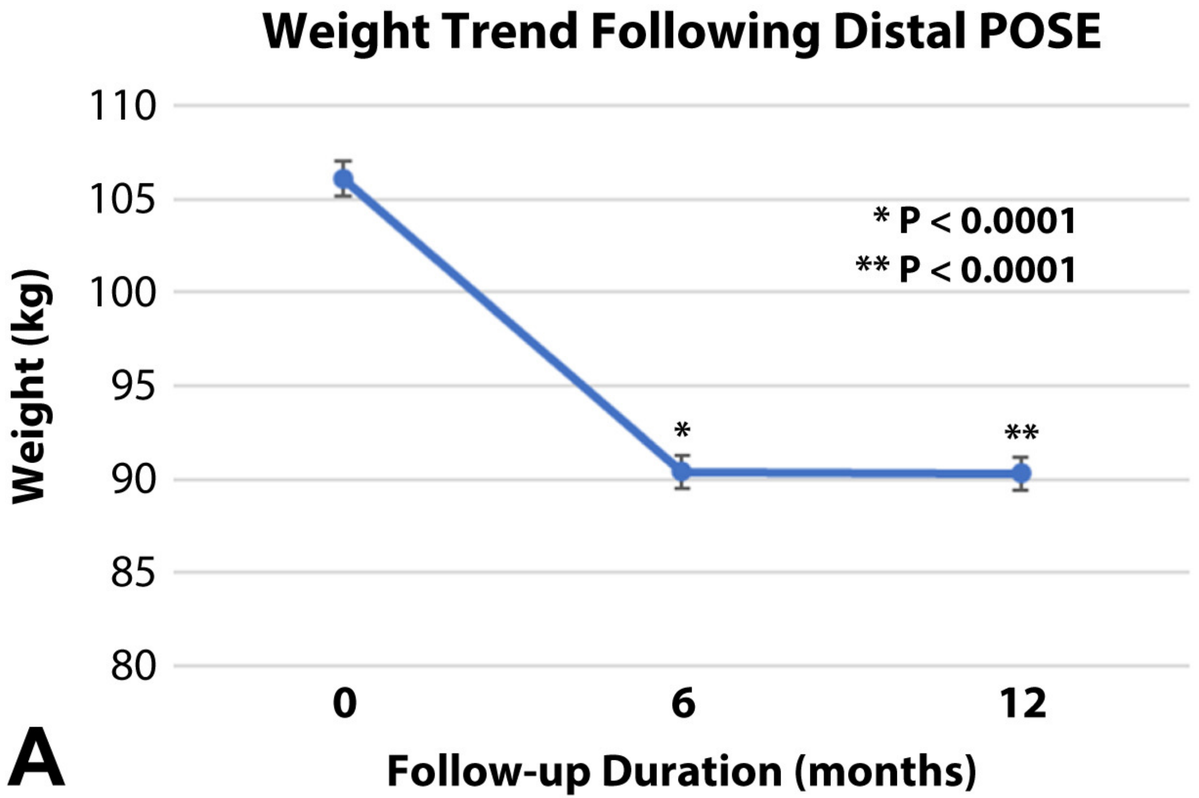


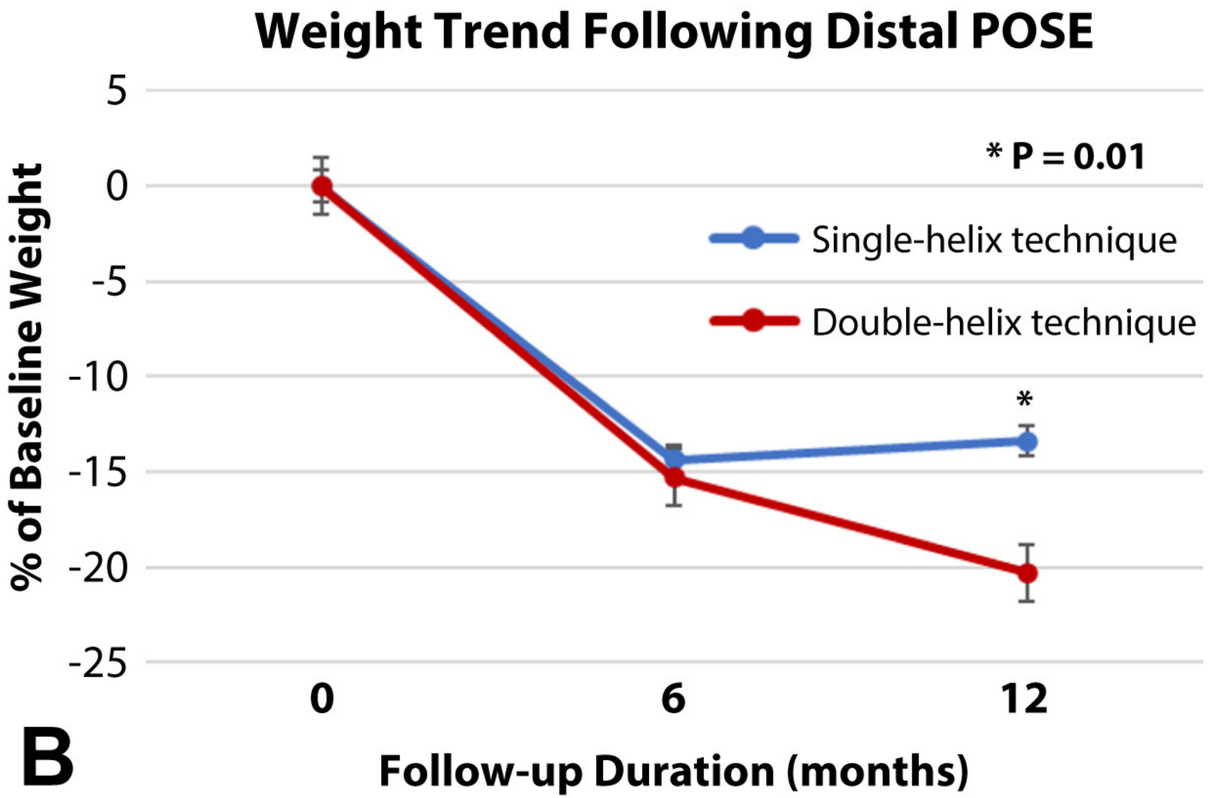






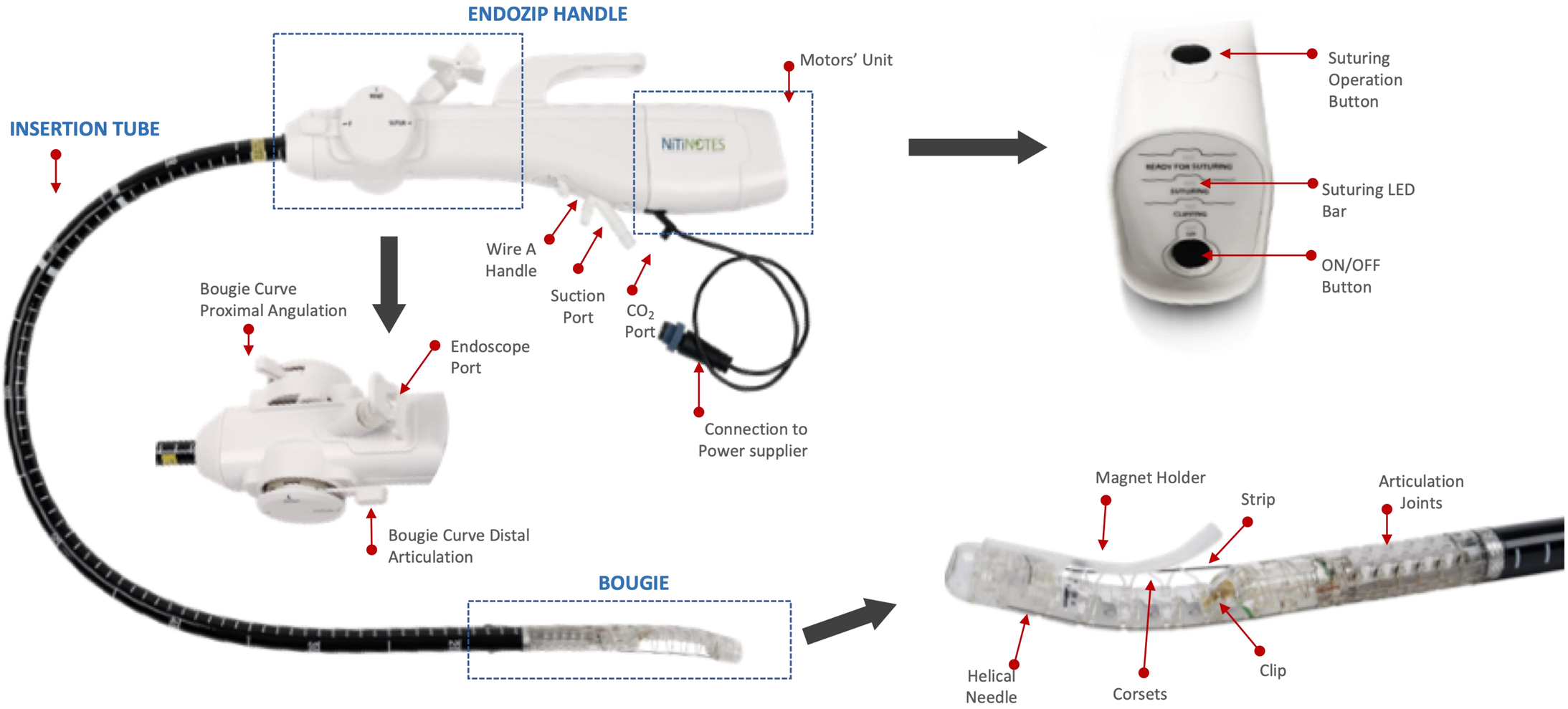
POSE- Double helix Technique





Jirapinyo, Thompson C. GIE 2022

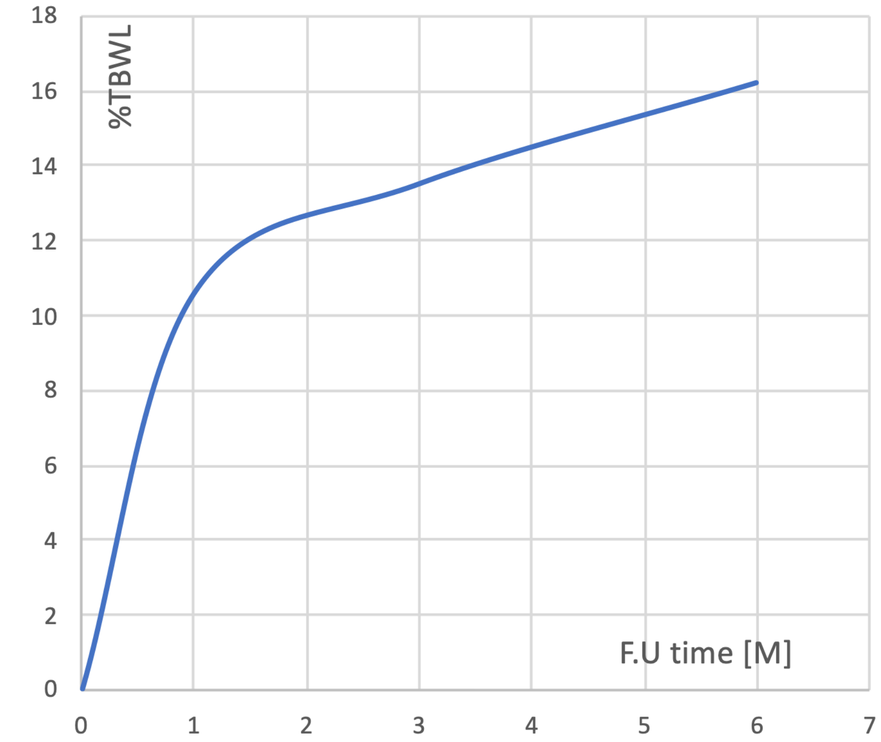
Robotic Endoscopy- Endozip



Robotic Endoscopy- Endozip

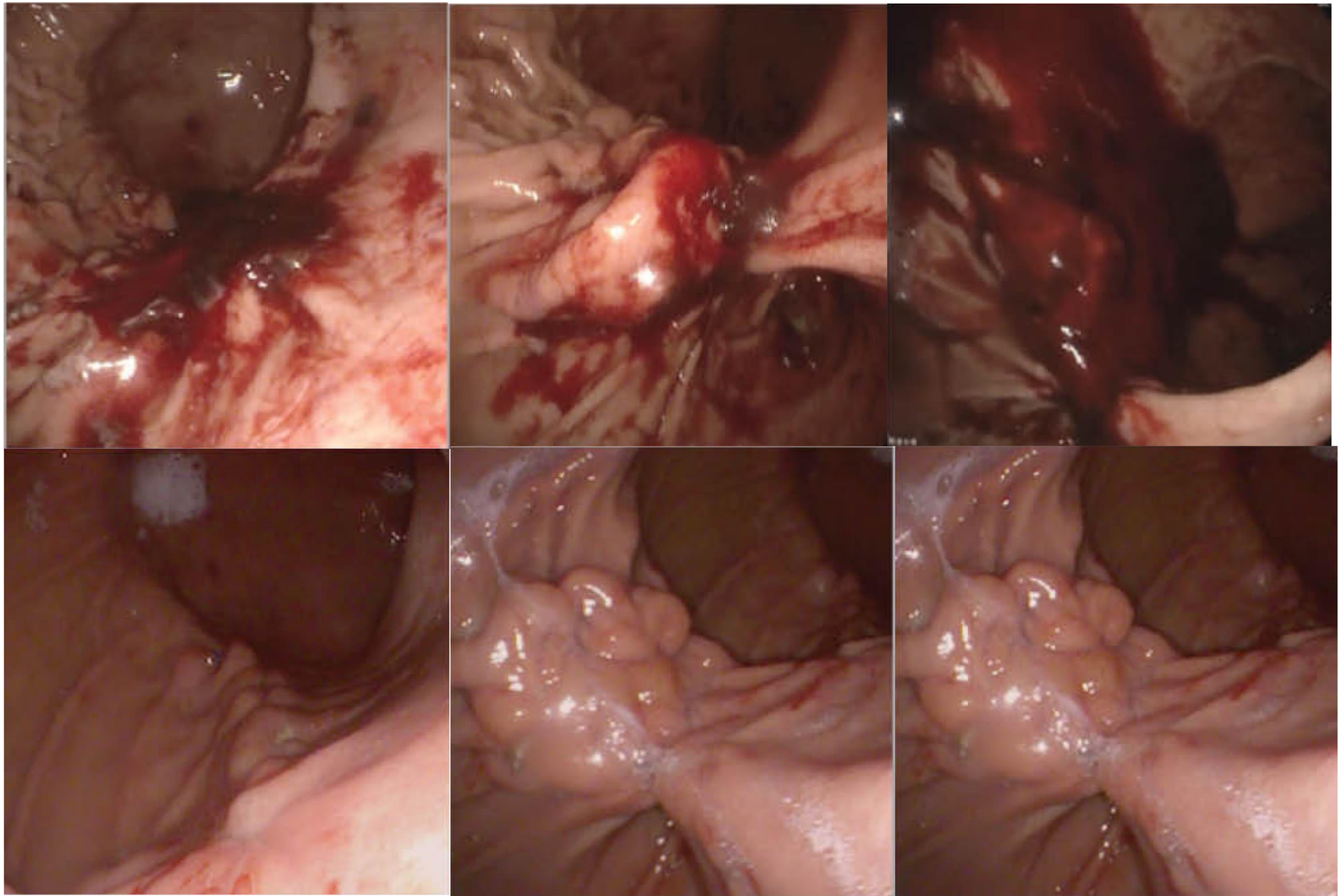
First in Human Study- First Generation

VARIABLE	INITIAL	1 Mo	3 Mo	6 Mo
BMI (kg/m2)	**36.9** ± 2.8	**33.0** ± 3.2	**31.9** ± 3.4	**30.9** ± 3.4
TBWL	NA	**11.6** ± 3.0	**14.8** ± 4.8	**17.8** ± 6.7
%TBWL	NA	**10.6** ± 3.0	**13.5** ± 4.7	**16.2** ± 6.0
%EWL	NA	**36.3** ± 20.9	**46.5** ± 28.6	**54.3** ± 28.4



Lopez Nava, Ravishankar Asokkumar et al. Obesity Surgery 2019

Post-Suturing

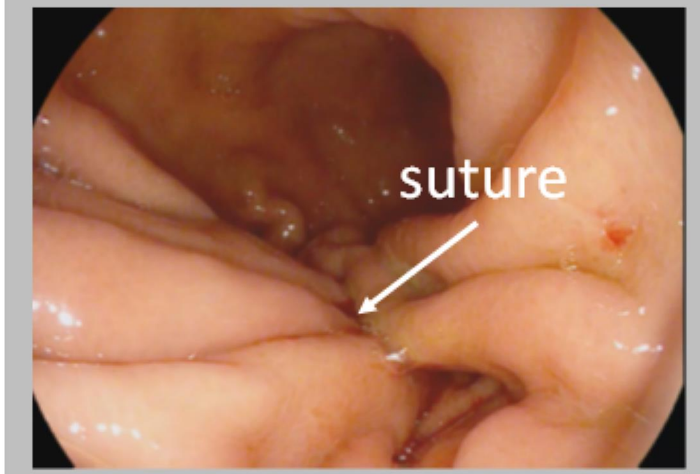


Endozip Multicenter Study

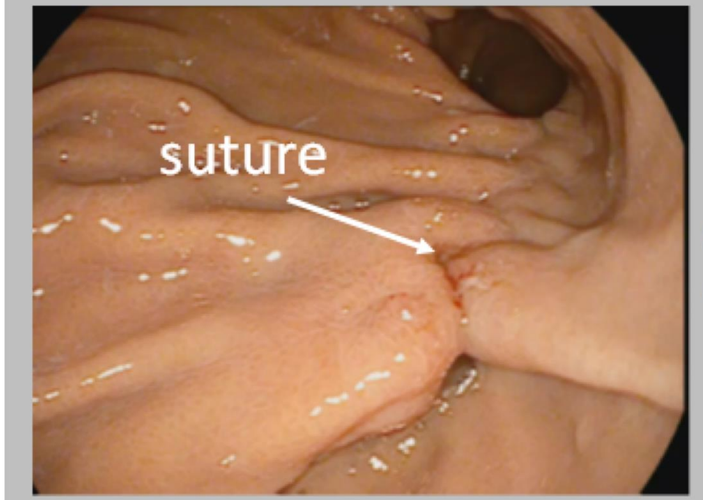
Number of Pts.	45		
Gender	Female: 40 (89%)		Male: 5 (11%)
	Mean	SD	Range (min-max)
Age (years):	*44.13*	*8.76*	*28-68*
Weight (kg):	*95.23*	*12.37*	*76.6-129.70*
Height (cm):	*165.71*	*7.62*	*152-185*
BMI (kg/m^2):	*34.55*	*2.91*	*30.12-39.78*
Waist Circumference (cm):	*109.66*	*9.44*	*96-133*

OR

Endozip robotic system

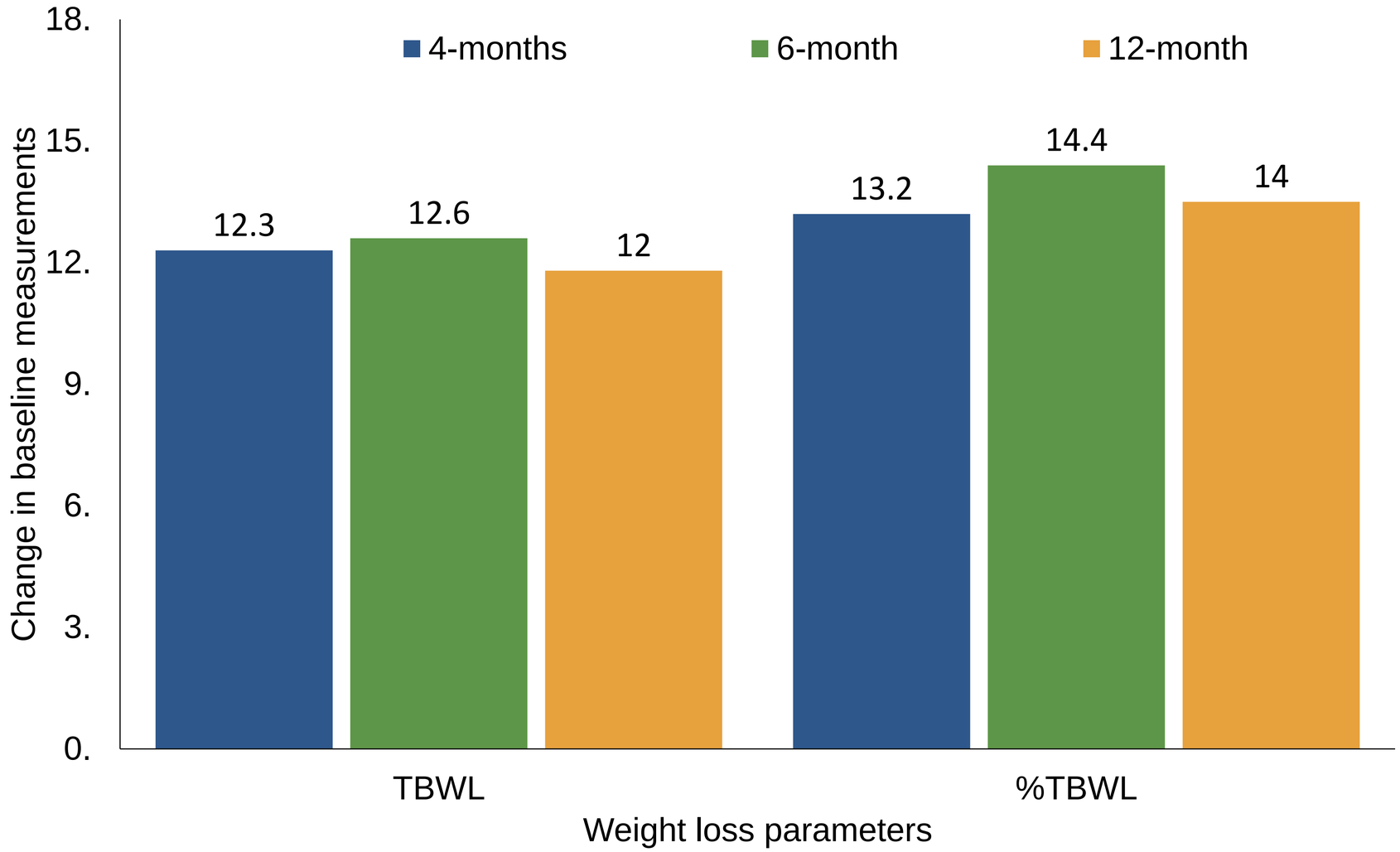


Suturing result procedure day



Suturing result at 6 months FU

Endozip Multicenter Study



Conclusion

- All the endoscopic options are effective to combat obesity and induce weight loss
- Differences are mainly in the technique, accessories, cost, and learning curve
- Weight loss efficacy is comparable among different technique in short term
- Durable plications/sutures lead to long term weight maintenance need to be studied
- Learning curve outcome with different techniques need assessment