BPL and TALL-CC in RYGB and OAGB What do they have in common and how are they different?

Almino Cardoso Ramos MD

MSc, PhD, FACS, FASMBS, FIFSO

Gastro-Obeso-Center/Sao Paulo/Brazil – Medical Director

IFSO President 2018-2019

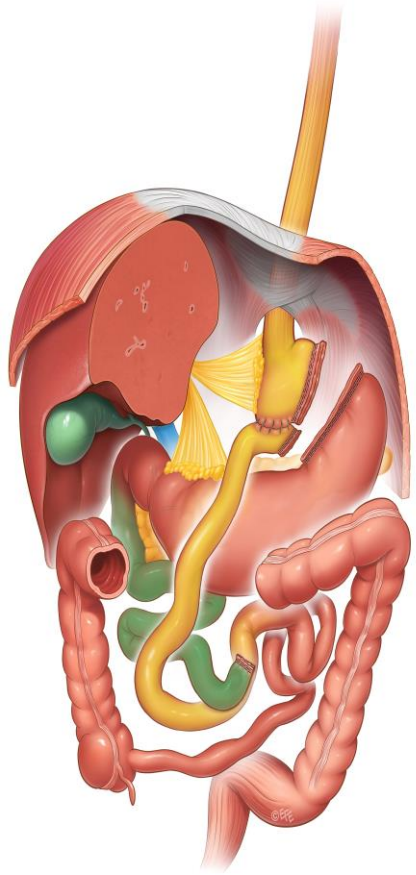
President Brazilian Society for Bariatric and Metabolic Surgery – SBCBM – 2013-2014

Consultant Surgeon Weight Loss Journey – Ecuador

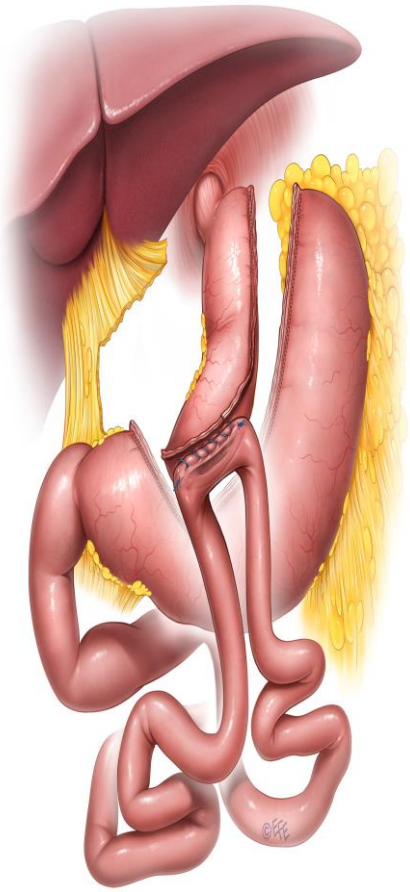
Consultant Surgeon Elias Ortiz & Co - Mexico

No disclosures related to this presentation

RYGB



OAGB



The Bypasses

IFSO Worldwide Survey 2020–2021: Current Trends for Bariatric and Metabolic Procedures

Table 1 The number and the type of operations worldwide in 2018, 2020, and 2021

	2018	2020	2021
Sleeve gastrectomy (SG)	386,096	304,352	351,689
Roux-en-Y gastric bypass (RYGB)	203,769	133,007	159,543
One anastomosis gastric bypass (OAGB)	46,406	29,117	46,113
Biliopancreatic diversion (BPD)	6506	6896	7973
Adjustable gastric banding (AGB)	9757	6116	5010
Other surgical operations	14,346	13,949	13,238
Intragastric balloons	27,780	11,492	12,421
Other endoluminal procedures	1531	2877	2707
Total	**696,191**	**507,806**	**604,099**

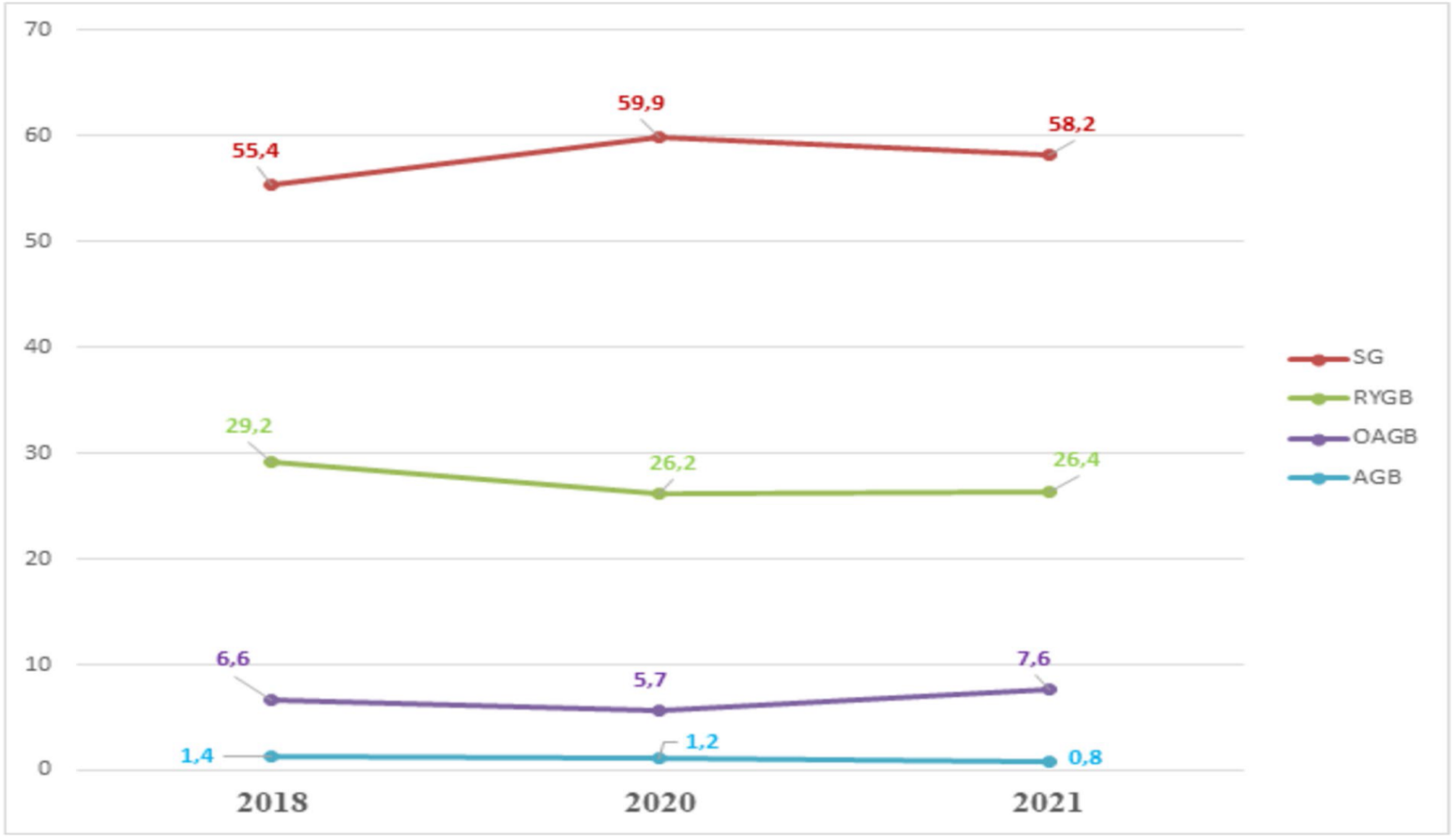
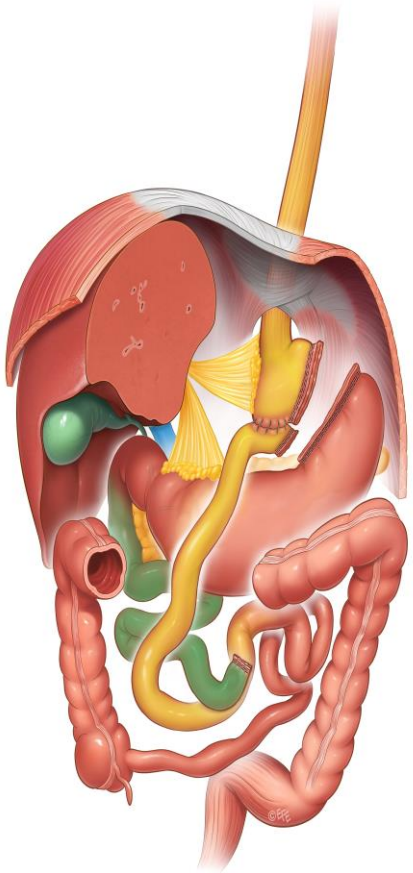


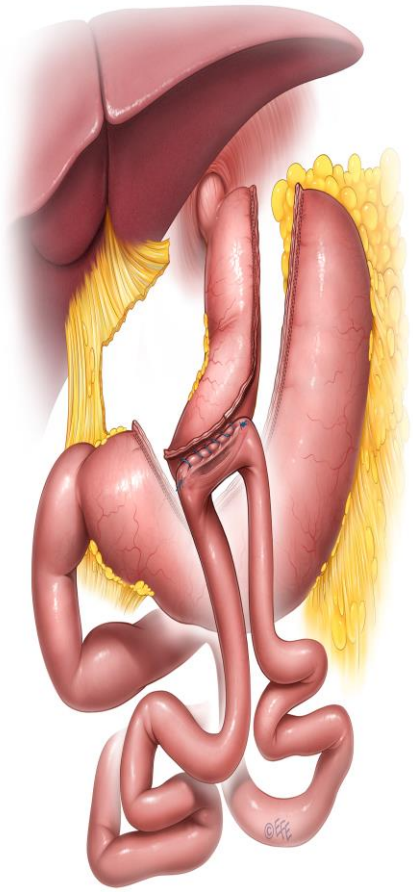
Fig. 2 The worldv

Luigi Angrisani et al, Obes Surg. 2024 Apr;34(4):1075-1085.

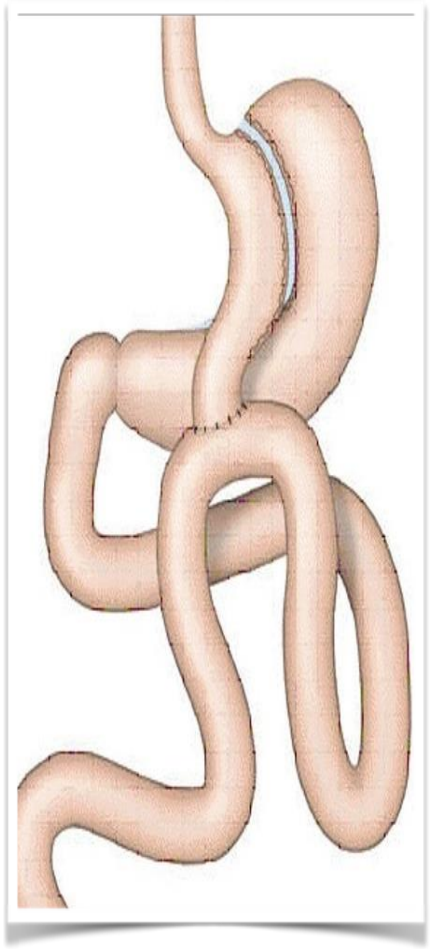
RYGB



OAGB



MGB



BAGUA

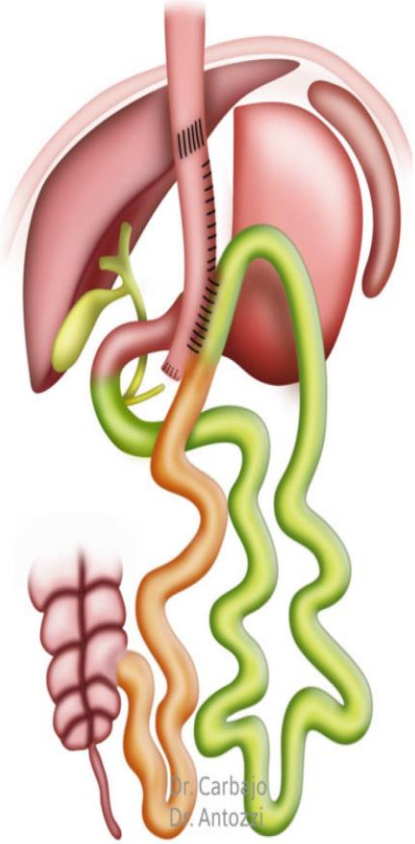


Fig. 1 Classic OAGB with antireflux mechanism

GOC CENTRO DE OTIMIZAÇÃO METABÓLICA

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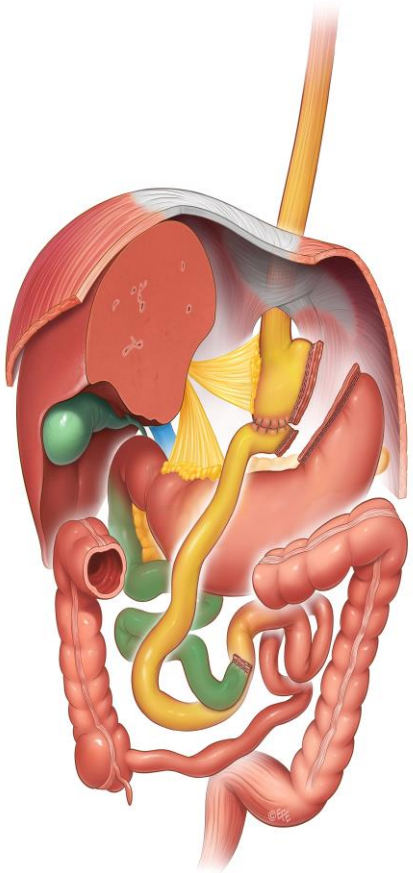
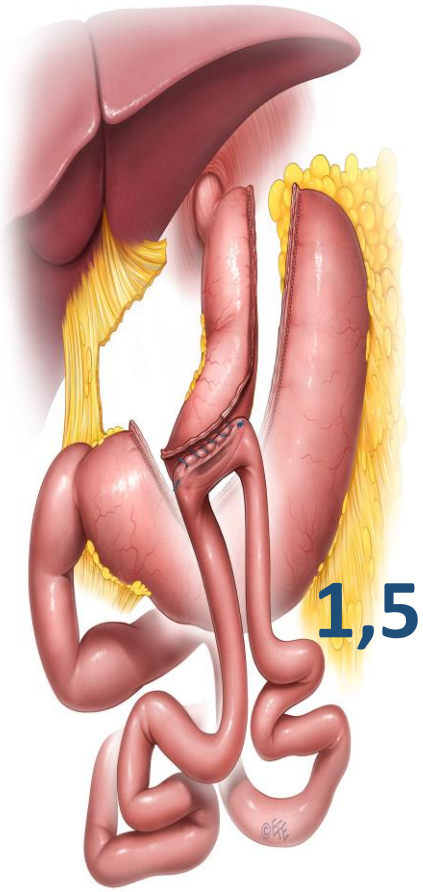
MEXICO WEIGHT LOSS SPECIALISTS

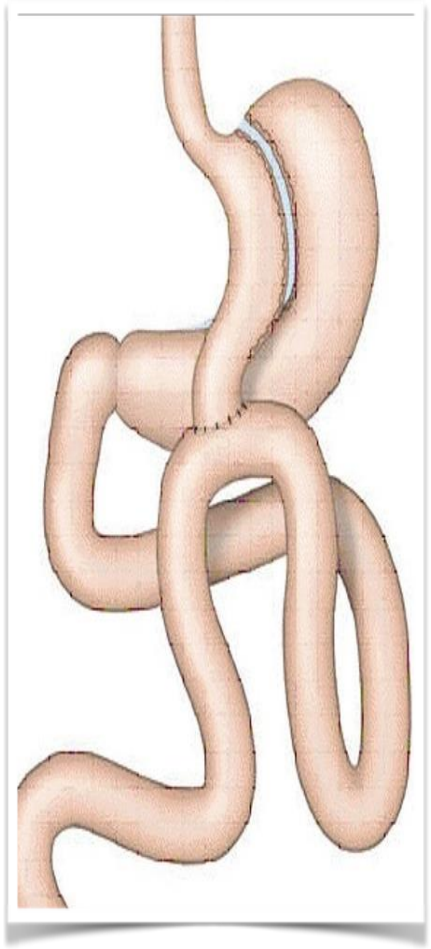
RYGB



OAGB



MGB



BAGUA

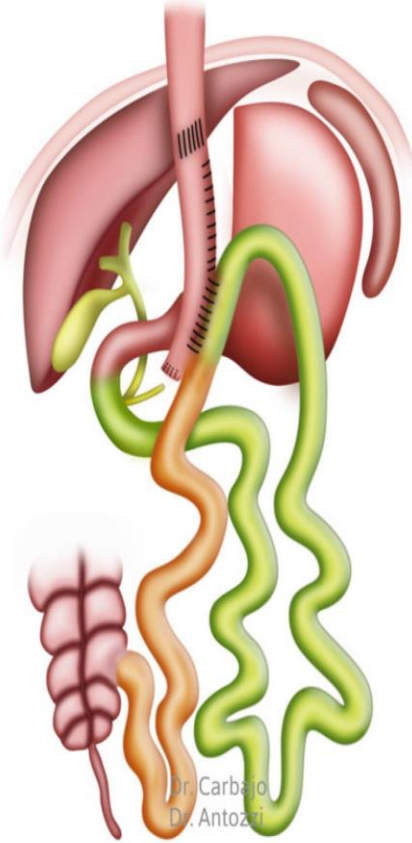
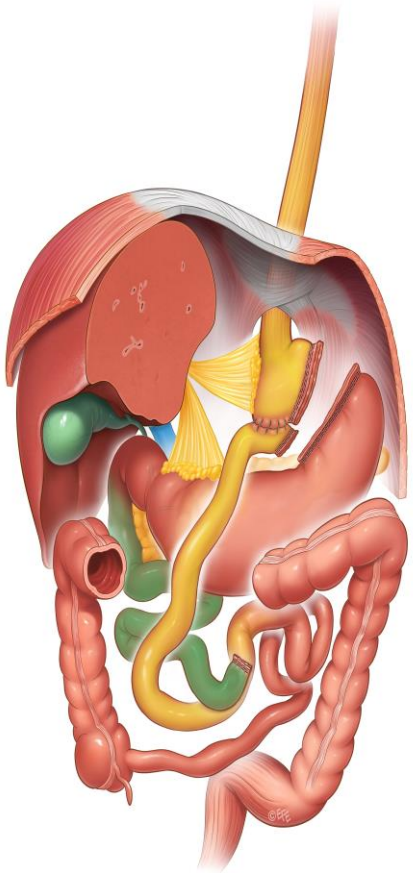
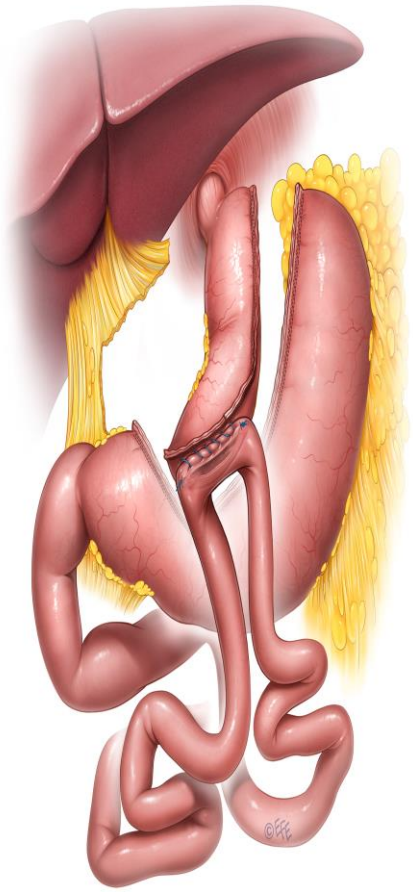


Fig. 1 Classic OAGB with antireflux mechanism

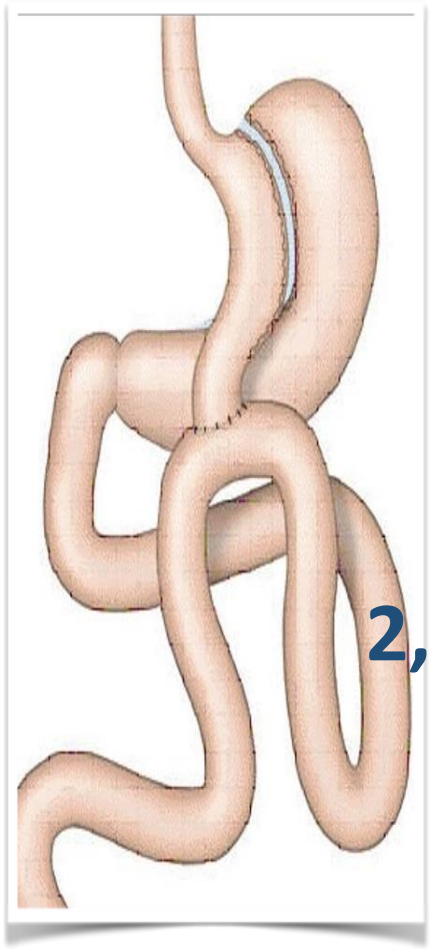
RYGB



OAGB



MGB



2,0 m

BAGUA

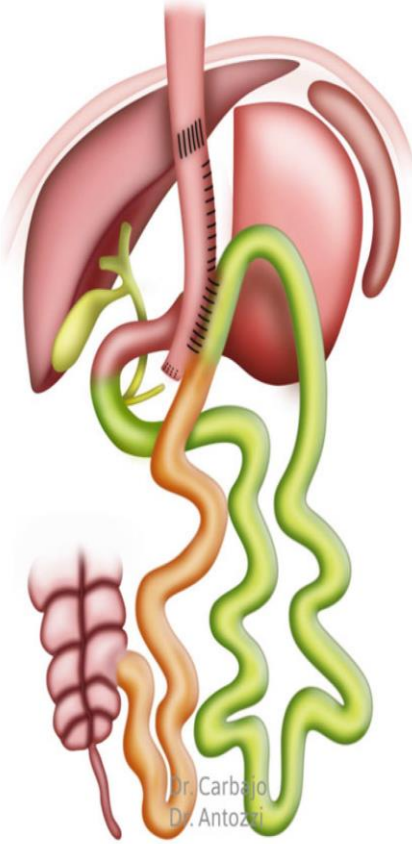


Fig. 1 Classic OAGB with antireflux mechanism

CENTRO DE OTIMIZAÇÃO METABÓLICA

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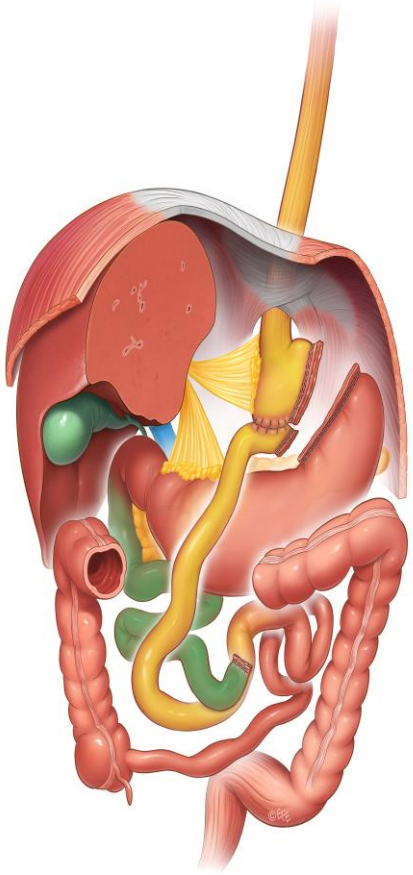
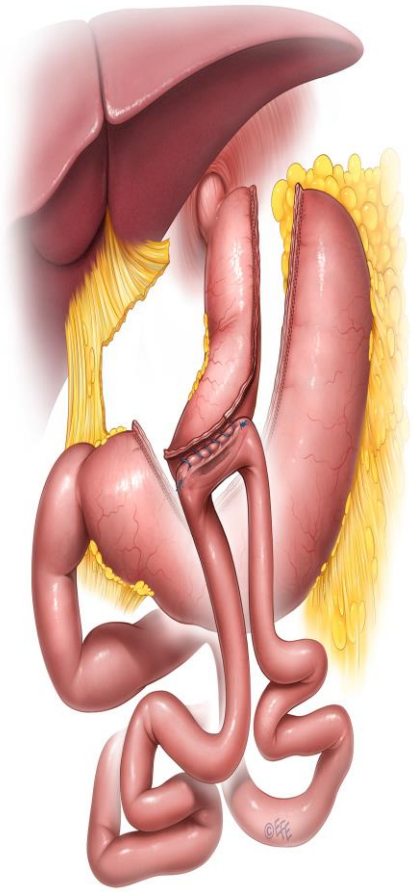
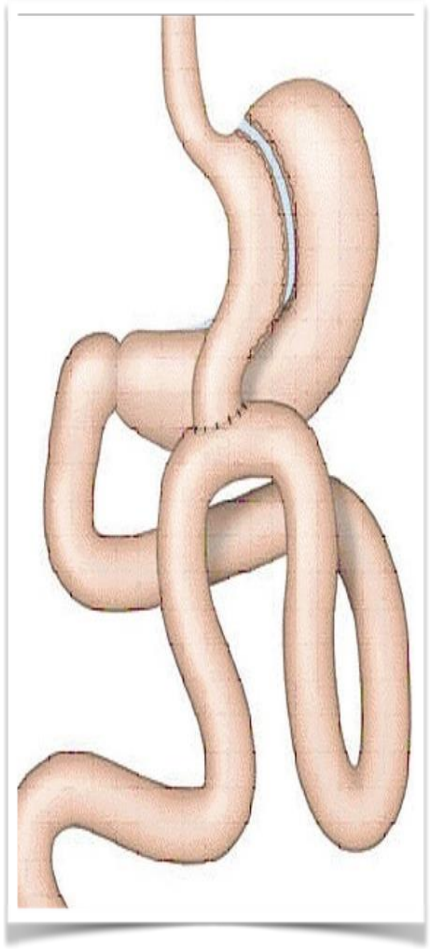
RYGB



OAGB



MGB



BAGUA

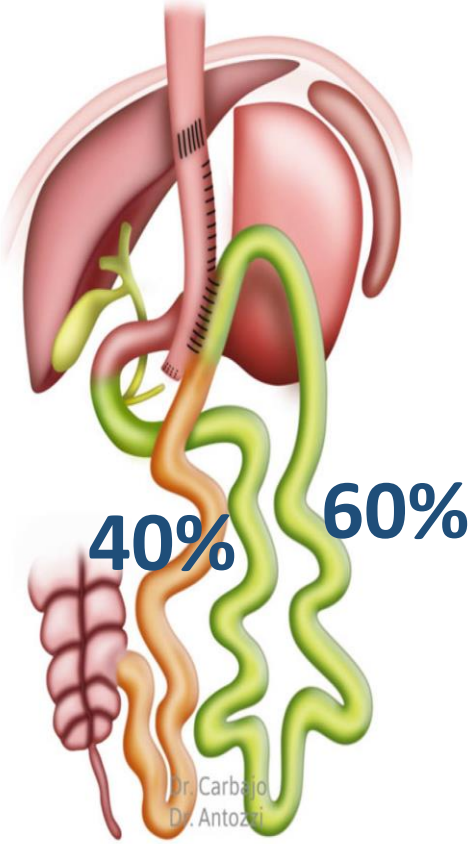


Fig. 1 Classic OAGB with antireflux mechanism

GOC CENTRO DE OTIMIZAÇÃO METABÓLICA

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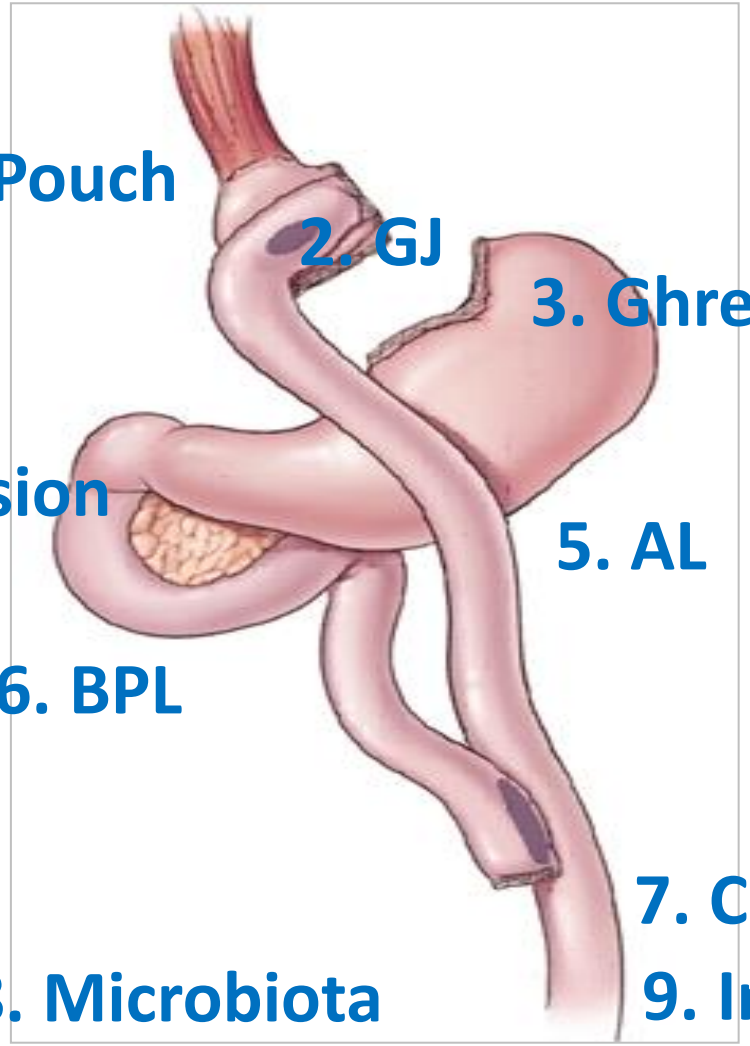
Mechanisms of RYGB



1.Pouch

2. GJ

3. Ghrelin

4. Duodenal exclusion

5. AL

6. BPL

7. CC

8. Microbiota

9. Incretins

10. Biliary acids

Small pouch

50-80 ml

G-J Anastomosis

Less than 3 cm

Short BPL

Less than 1 m

Short AL

Max 1,5 m

CC

???

TALL

Longer

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Mechanisms of OAGB

1.Pouch

2. GJ

3. Ghrelin

4. Duodenal exclusion

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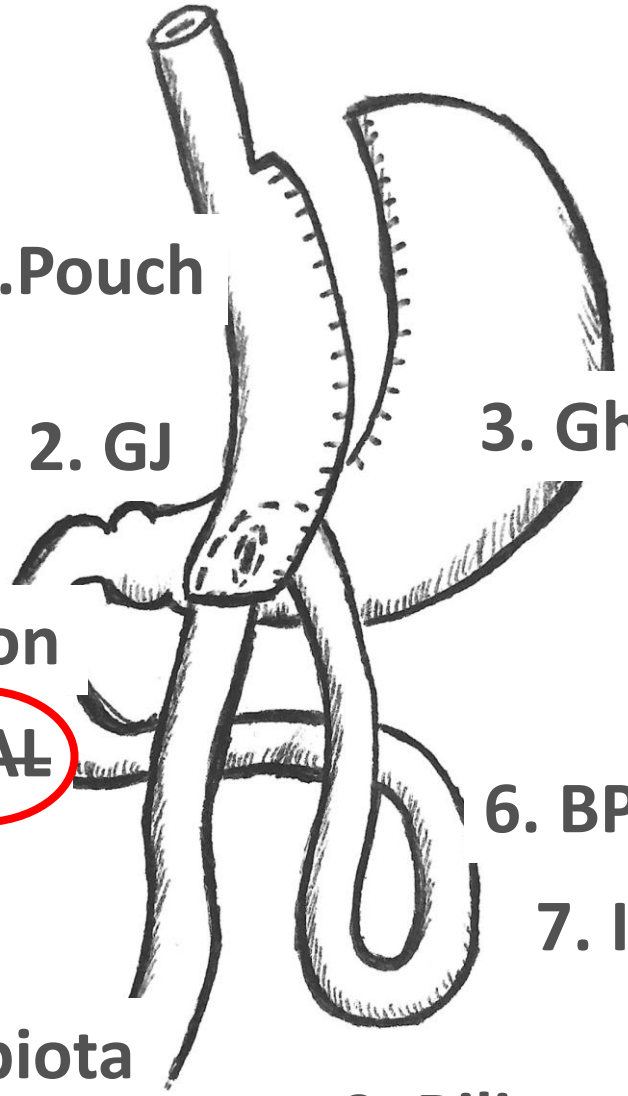

Fig. 1. Schematic representation of on
laterolateral anastomosis is created bet
gastric pouch 15–18 cm long and a jejunal loop ~200 cm distal to the
duodenal ligament of Treitz.

Longer pouch

> 15 cm

G-J Anastomosis

Wider than 3 cm

Longer BPL

1,5 m minimum

AL

No

CC

???

TALL

Shorter

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• Tolone S et al. Surg Obes Relat Dis. 2016;12(1):62-9.

Bowel length: Literature Review

Table 1
Small bowel length and its correlations in historical series

Author	Number of cases	C/L	Sex	SBL			Correlation with		
				Minimum	Average	Maximum	Age	Height	Weight
Treves (1885) (4)	100	C	M	472	686	970	NO	NO	NO
			F	574	711	894	NO	NO	NO
Dreike (1894) (5)	27	C	M	421	633	1013			
	23		F	340	526	856			
Bryant (1924) (6)	160	C	Both	305	625	864	Negative correlation		
	27		M	457	663	813			
	17		F	406	587	762			
Underhill (1955) (7)	65	C	M	488	638	785	NO	YES	
	35		F	335	592	716			
Backman (1974) (8)		C	Obese M	455	824	1193			
			Obese F	497	734	971			
			Non-obese M	365	698	1031			
			Non-obese F	361	616	871			
Guzman (1977) (9)	56	L	Obese	253	562	871			
	22		Non-obese	201	530	813			
Nordgreen (1997)(10)	40	L	M	380	591	1090	NO	YES	YES
	37		F	360	534	740	NO	YES	YES
Hounnou (2002) (11)	100	C	M	365	644	1000	Negative correlation	NO	YES
	100		F	280	573	840	Negative correlation	NO	YES
Hosseinpour (2008) (12)	54	L	M	285	459	619	NO	NO	N
	46		F	308	468	620			
Teitelbaum (2013) (13)	240	L	(113 M + 127 F)	285	596	845	NO	YES	NO

SBL = small bowel length (cm); C = cadaver data; M = males; F = females; L = live patient data

372 609 871

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XXVII IFSO World Congress IFSO Melbourne 2024

Tacchino RM. Surg Obes Relat Dis. 2015;11(2):328-34.

Total bowel length

Table 4. Total small bowel length

	n	Maximum length (cm)	Minimum length (cm)	Average length (cm)
Female	342	997	473	707
Male	98	1065	497	776
Both	440	1065	473	722

Obesity Surgery, 8, 267–282

Biliopancreatic Diversion with a Duodenal Switch

Douglas S. Hess MD, FACS; Douglas W. Hess MD

Wood County Hospital, Bowling Green, OH, USA

Bowel length: Literature Review

ELSEVIER

Surgery for Obesity and Related Diseases ▮ (2014) 00–00

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

Bowel length: measurement, predictors, and impact on bariatric and metabolic surgery

Roberto M. Tacchino, M.D.*

Department of Surgery, Catholic University of the Sacred Heart, Rome, Italy

Received May 9, 2014; accepted September 11, 2014

N=443

3 different measurement methods (Laparotomy, Laparoscopy)

SBL was 690 +-93.7 cm (range 350-1049 cm)

Men > Women (729 +- 85cm versus 678 +- 92cm , P<0.0001)

SBL correlation with height

Tacchino RM. Surg Obes Relat Dis. 2015;11(2):328-34.

Patient with 7m bowel total length

	RYGB	OAGB	MGB	BAGUA
BPL	1,0 m	1,5 m	2,0 m	4,2 m
AL	1,5 m	-	-	-
CC	4,5 m	5,5 m	5,0 m	2,8 m
TALL	6,0 m	5,5 m	5,0 m	2,8 m

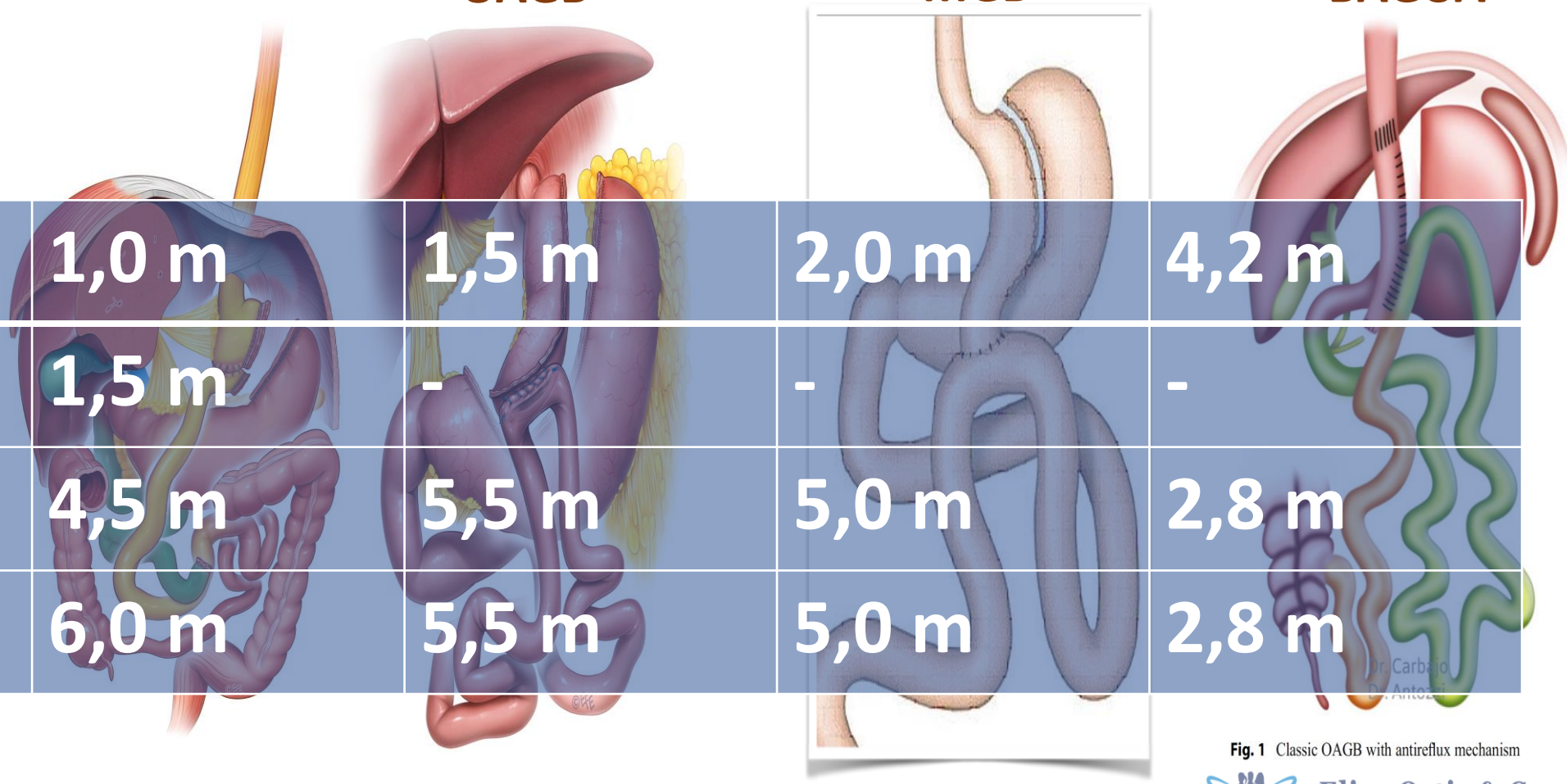

Fig. 1 Classic OAGB with antireflux mechanism

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Patient with 5 m bowel total length

	RYGB	OAGB	MGB	BAGUA
BPL	1,0 m	1,5 m	2,0 m	3,0 m
AL	1,5 m	-	-	-
CC	2,5 m	3,5 m	3,0 m	2,0 m
TALL	4,0 m	3,5 m	3,0 m	2,0 m

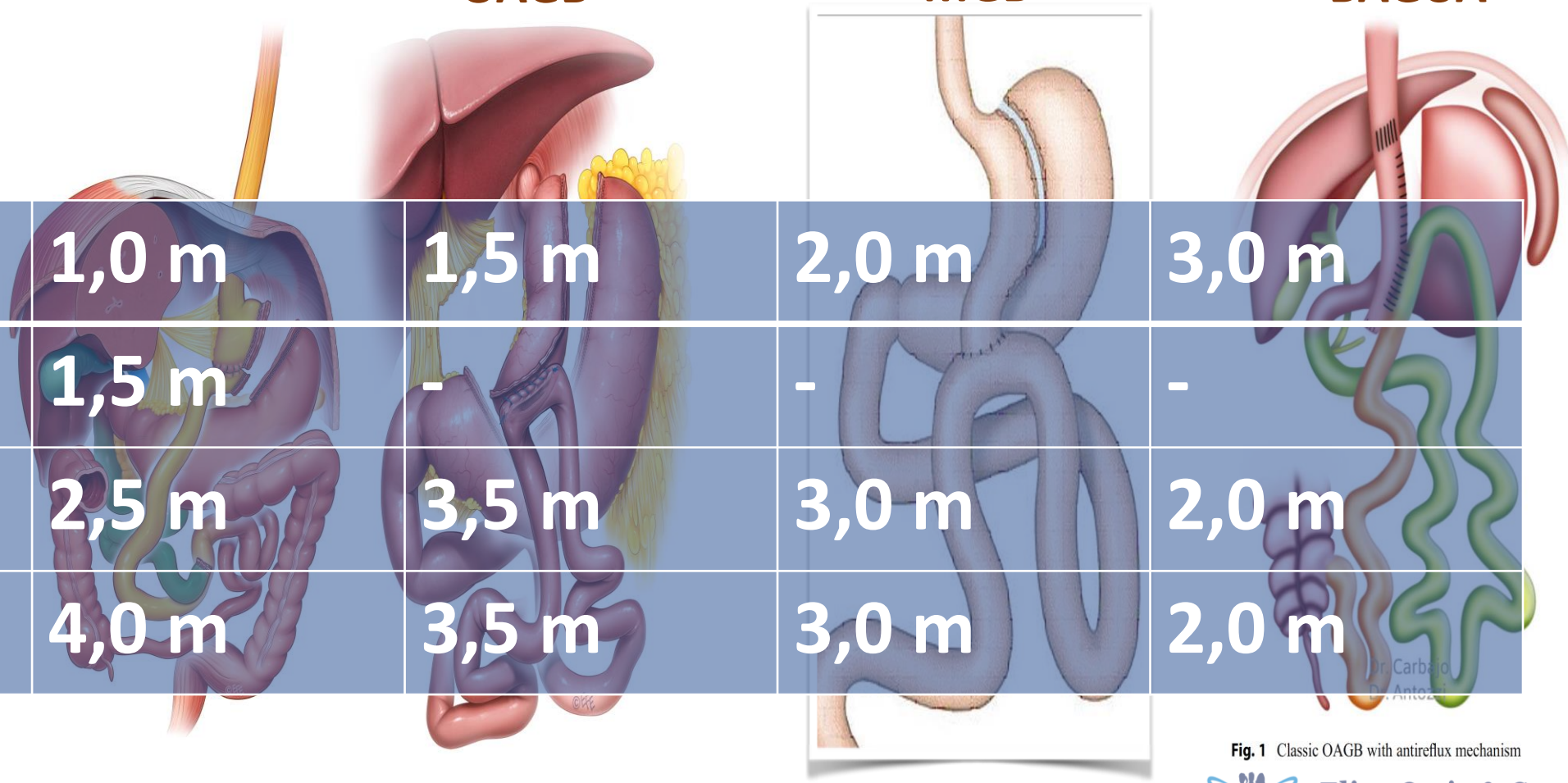

Fig. 1 Classic OAGB with antireflux mechanism

GOC CENTRO DE OTIMIZAÇÃO METABÓLICA

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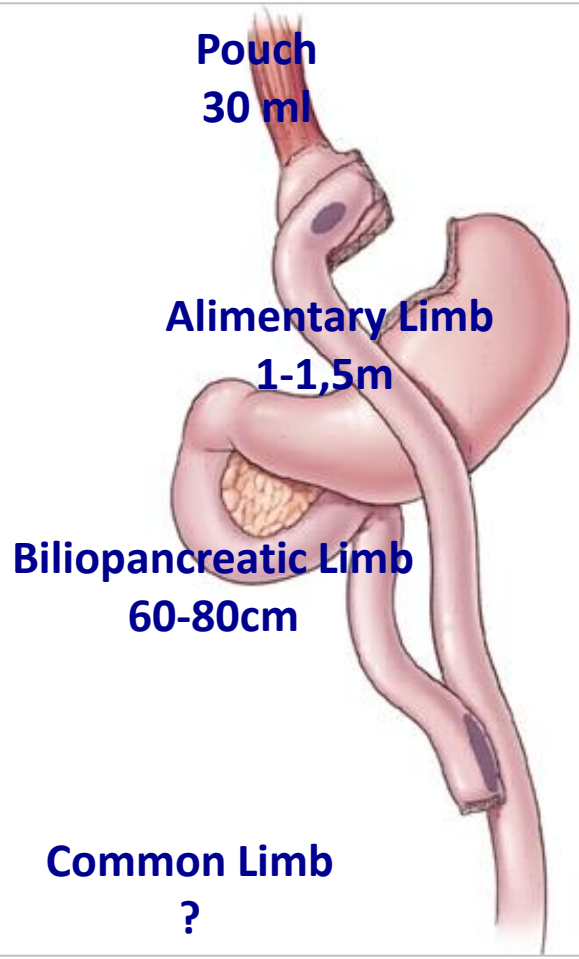
Energy Absorption after Long Limb RYGB



5 months Post Op
Reduced energy absorption
Malabsorption: 124+/-57 Kcal/d
Restriction: 2062+/-271 Kcal/d

14 months Post Op
Reduced energy absorption
Malabsorption: 172+/-60 Kcal/d
Restriction: 1418+/-171 Kcal/d

Reduced absorption of Fat
No difference in absorption of Protein and Carbohydrate

Odstrcil EA et al. Am J Clin Nutr. 2010;92(4):704-13.

Odstrcil EA et al. Am J Clin Nutr. 2010;92(4):704-13.

Increasing Alimentary Limb

ADVANCES IN SURGICAL TECHNIQUE

Long-limb Gastric Bypass in the Superobese

A Prospective Randomized Study

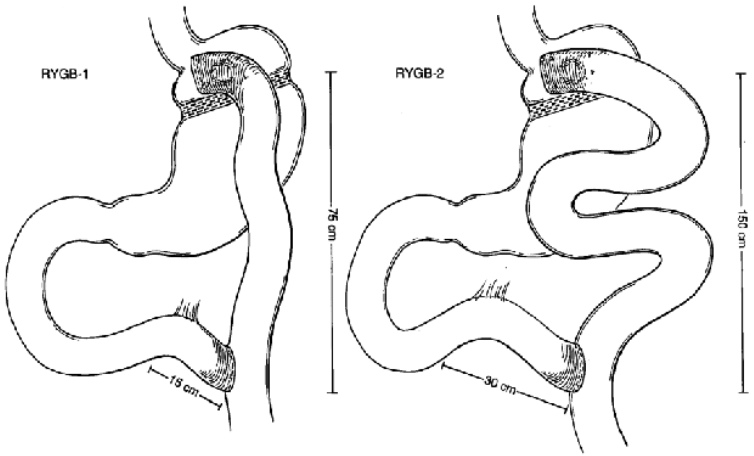


FIG. 1. (Left) In the conventional modification of gastric bypass (RYGB-1), the jejunum was transected 15 cm beyond the ligament of Treitz and the jejunojejunostomy was performed at a measured distance of 75 cm distal to the gastrojejunostomy. (Right) In the experimental group (RYGB-2), the jejunum was transected 30 cm distal to the ligament of Treitz and the jejunojejunostomy was created at a measured distance of 150 cm from the gastrojejunostomy.

45 patients

22p with 75cm AL
23p with 150cm AL

75cm AL 50% EWL after 24months
150cm AL 64% EWL after 24months

Light increase in WL with longer AL/Roux Limb

Brolin et al: Ann Surg 1992; 4(215) 387-395

Increasing Alimentary Limb

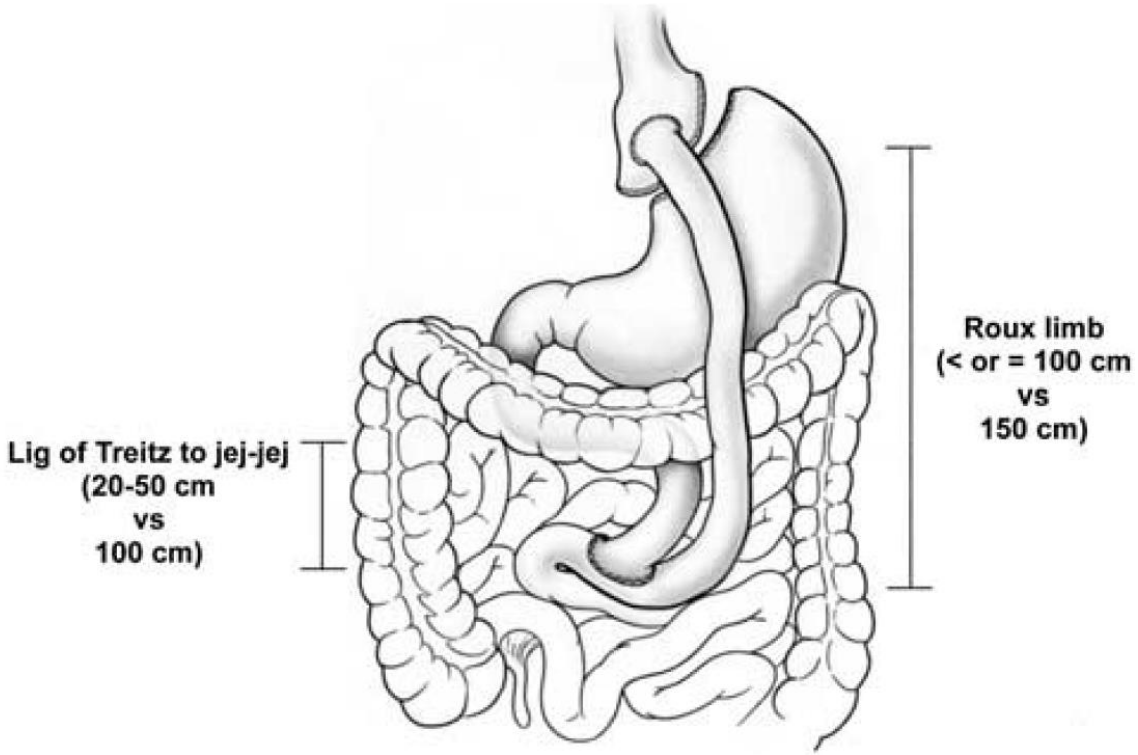


Fig. 3. Limb lengths: In sRYGB group patients, the distance from the ligament of Treitz to the jejunojejunostomy is 20–50 cm and the Roux limb is 100 cm. In eRYGB patients, the distance from the ligament of Treitz to the jejunojejunostomy is 100 cm and the Roux limb is 150 cm.

No increasing in WL with longer AL/Roux Limb

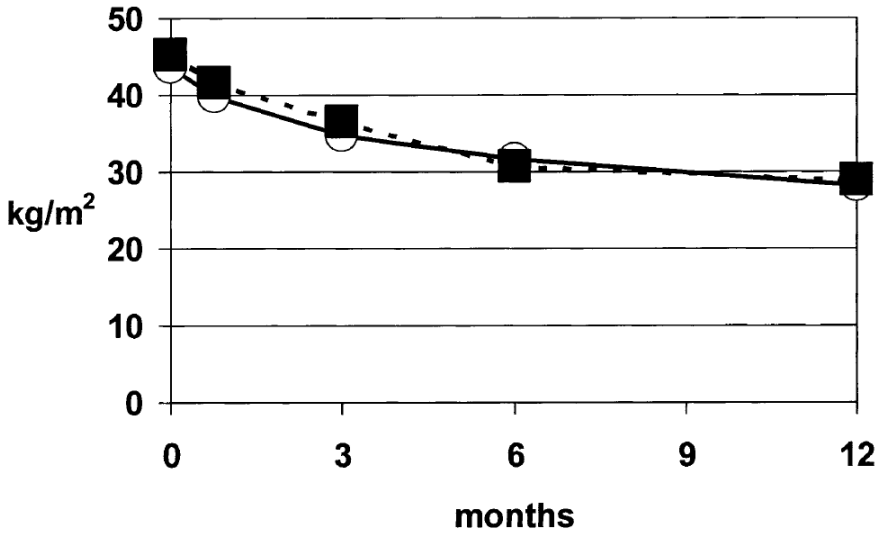


Fig. 5. BMI (kg/m^2): standard length (*open circles*) vs extended length (*filled squares*). There were differences between the groups at any time point. *Standard length:* significant decreases at all time points. *Extended length:* significant decreases up to 6 months but not to 12 months (ANOVA, Games-Howell post hoc, $p < 0.05$).

Feng JJ et al. Surg Endosc. 2003;17(7):1055-60.

Increasing Alimentary Limb

JAMA Surgery | Original Investigation

Standard vs Distal Roux-en-Y Gastric Bypass in Patients With Body Mass Index 50 to 60

A Double-blind, Randomized Clinical Trial

Hilde Risstad, MD; Marius Svanevik, MD; Jon A. Kristinsson, MD, PhD; Jøran Hjelmesæth, MD, PhD; Erlend T. Aasheim, MD, PhD; Dag Hofsø, MD, PhD; Torgeir T. Søvik, MD, PhD; Tor-Ivar Karlsen, PhD; Morten W. Fagerland, MSc, PhD; Rune Sandbu, MD, PhD; Tom Mala, MD, PhD

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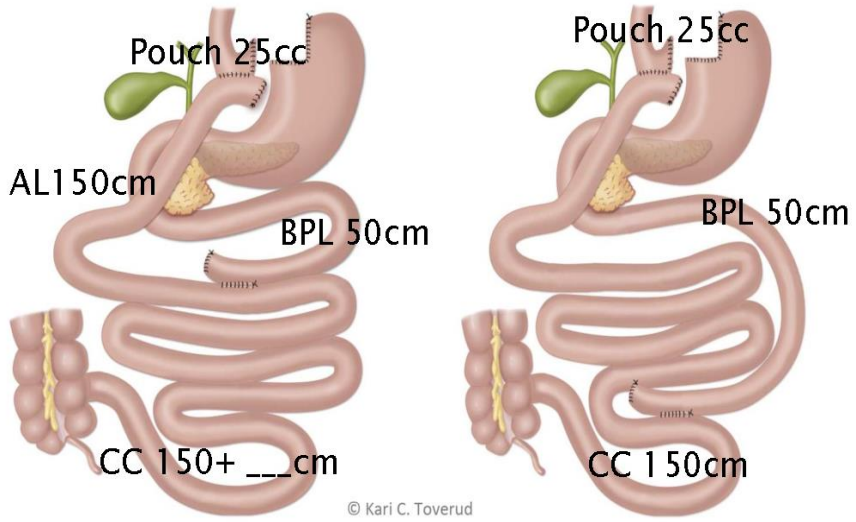


Standard gastric bypass Distal gastric bypass

JAMA Surgery December 2016 Volume 151, Number 12; 1146-1155

double-blind, randomized clinical trial
113 patients with a body mass index of 50 to 60kg/m2

BMI loss **17.8** two years after standard gastric bypass

BMI loss **17.2** two years after distal gastric bypass,

a nonsignificant difference.

JAMA Surgery December 2016 Volume 151, Number 12; 1146-1155

No increasing in WL with longer AL/Roux Limb

Alimentary Limb Hypertrophy

Intestinal Hypertrophy

At the surgery

Late after surgery

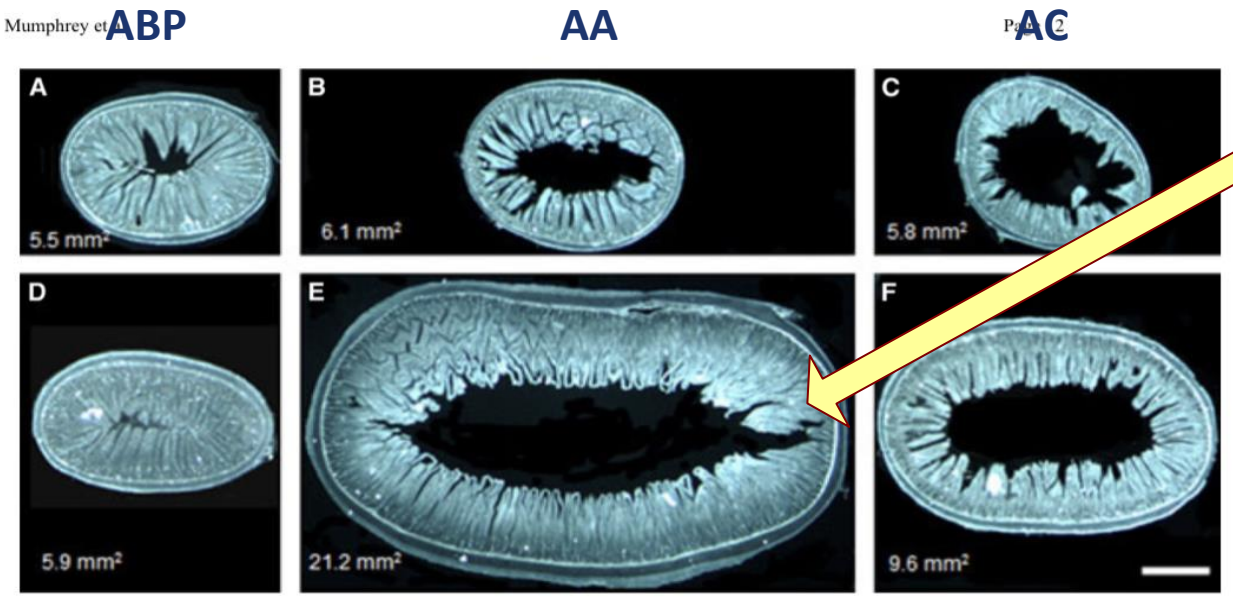
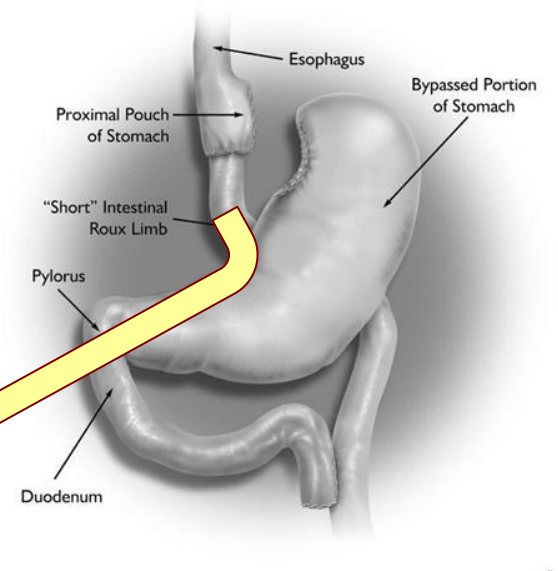


Figure 1.
Representative dark field images of cross-sections of the biliopancreatic (A, D), Roux (B, E), and common (C, F) limbs or their corresponding gut segments of rats at 10–11 months after sham (A–C) or RYGB surgery (D–F), showing hypertrophy of the Roux and common limbs but not the biliopancreatic limb. Surface areas in mm2 of the representative cross-sectioned segments are shown in the left bottom corner of each panel. Scale bar in F, 1.0 mm.



GOC CENTRO DE OTIMIZAÇÃO METABÓLICA

Elias Ortiz & Company
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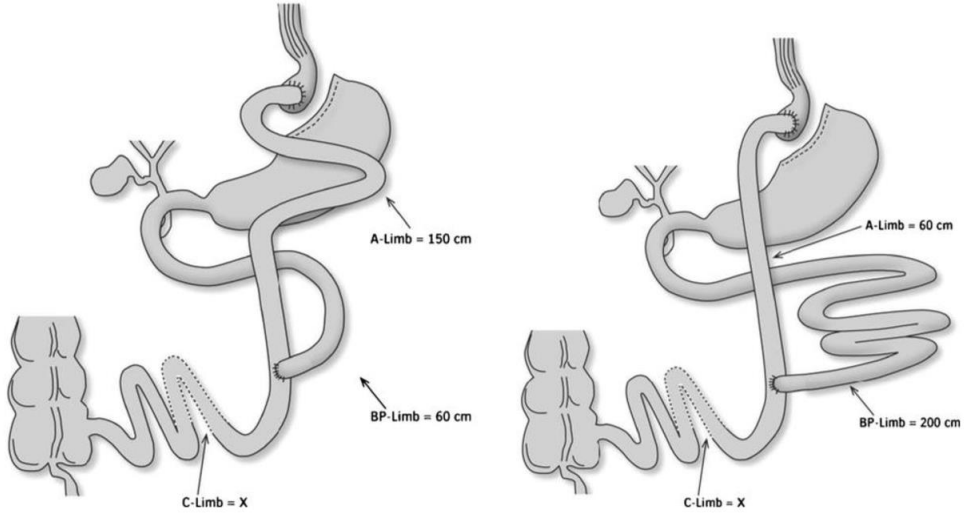
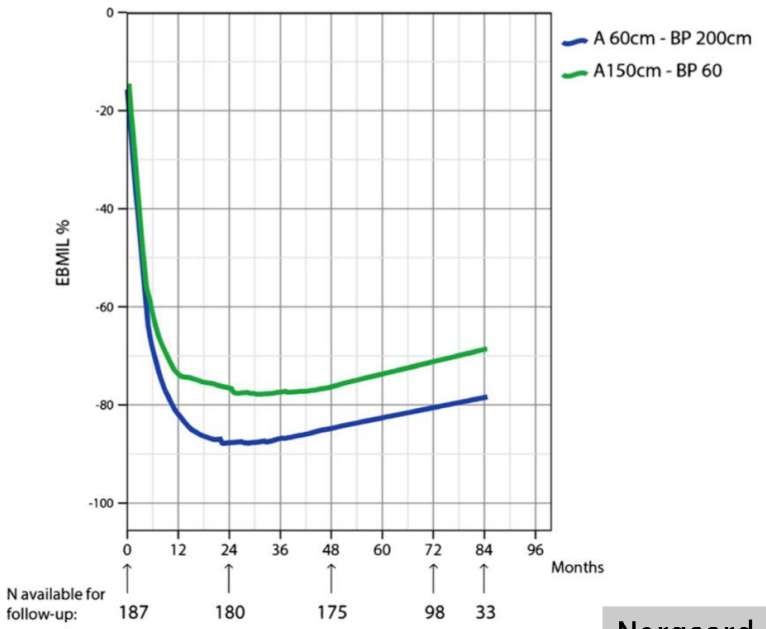
Increasing Biliopancreatic Limb

Gastric Bypass with Long Alimentary Limb or Long Pancreato-Biliary Limb—Long-Term Results on Weight Loss, Resolution of Co-morbidities and Metabolic Parameters



Nergaard et al. Obes Surg 2014: 1595

Gastric Bypass with Long Alimentary Limb or Long Pancreato-Biliary Limb—Long-Term Results on Weight Loss, Resolution of Co-morbidities and Metabolic Parameters



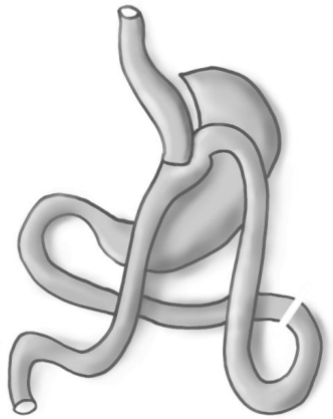
Nergaard et al. Obes Surg 2014: 1595

Increasing in WL with longer BPL 2m

Increasing Biliopancreatic Limb

Laparoscopic Mini-gastric Bypass: Experience with Tailored Bypass Limb According to Body Weight

Wei-Jei Lee · Weu Wang · Yi-Chih Lee · Ming-Te Huang · Kong-Han Ser · Jung-Chien Chen



Tailored limb approach

644 pat.

3 BMI Groups (pat.)	limb	mean BMI↓
– <40 (286)	**150cm**	10,7
– 40-50 (286)	**250cm**	15,5
– >50 (72)	**350cm**	23,3

Lower BMI group experienced a lower Hb despite the shorter bypass.

OBES SURG (2008) 18:294–299

The longer the BPL, more weight loss

More malabsorptive related complications

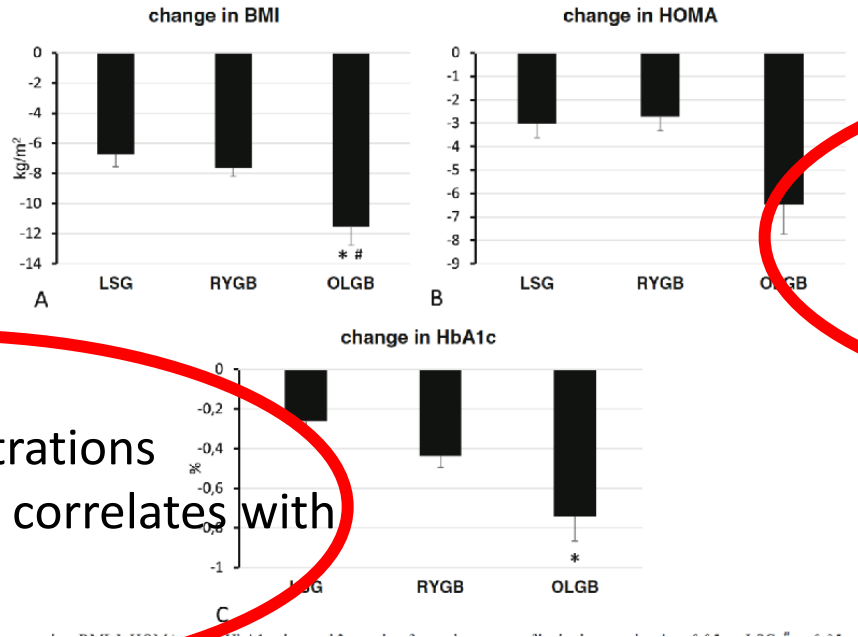
Increasing Biliopancreatic Limb

Obesity Surgery (2018) 28:3405–3414
https://doi.org/10.1007/s11695-018-3314-9

ORIGINAL CONTRIBUTIONS

Evidence That the Length of Bile Loop Determines Serum Bile Acid Concentration and Glycemic Control After Bariatric Surgery

Adriana Mika[1,2] · Lukasz Kaska[3] · Monika Proczko-Stepaniak[3] · Agnieszka Chomiczewska[1] · Julian Swierczynski[4,5] · Ryszard T Smolenski[4] · Tomasz Sledzinski[1]



Longer BPL:

Better weight Loss
Better Diabetes Control

- Higher BA concentrations
- BA concentrations correlates with BPL lenght

OBES SURG (2018) 28:3405–3414

Surgical Endoscopy (2022) 36:4946–4955
https://doi.org/10.1007/s00464-021-08850-y

Ten year comparative analysis of sleeve gastrectomy, Roux-en-Y gastric bypass, and biliopancreatic diversion with duodenal switch in patients with BMI ≥ 50 kg/m^2

Justin Maroun[1] · Mark Li[1] · Omobolanle Oyefule[1] · Joseph El Badaoui[1] · Travis McKenzie[1] · Michael Kendrick[1] · Todd Kellogg[1] · Omar M. Ghanem[1]

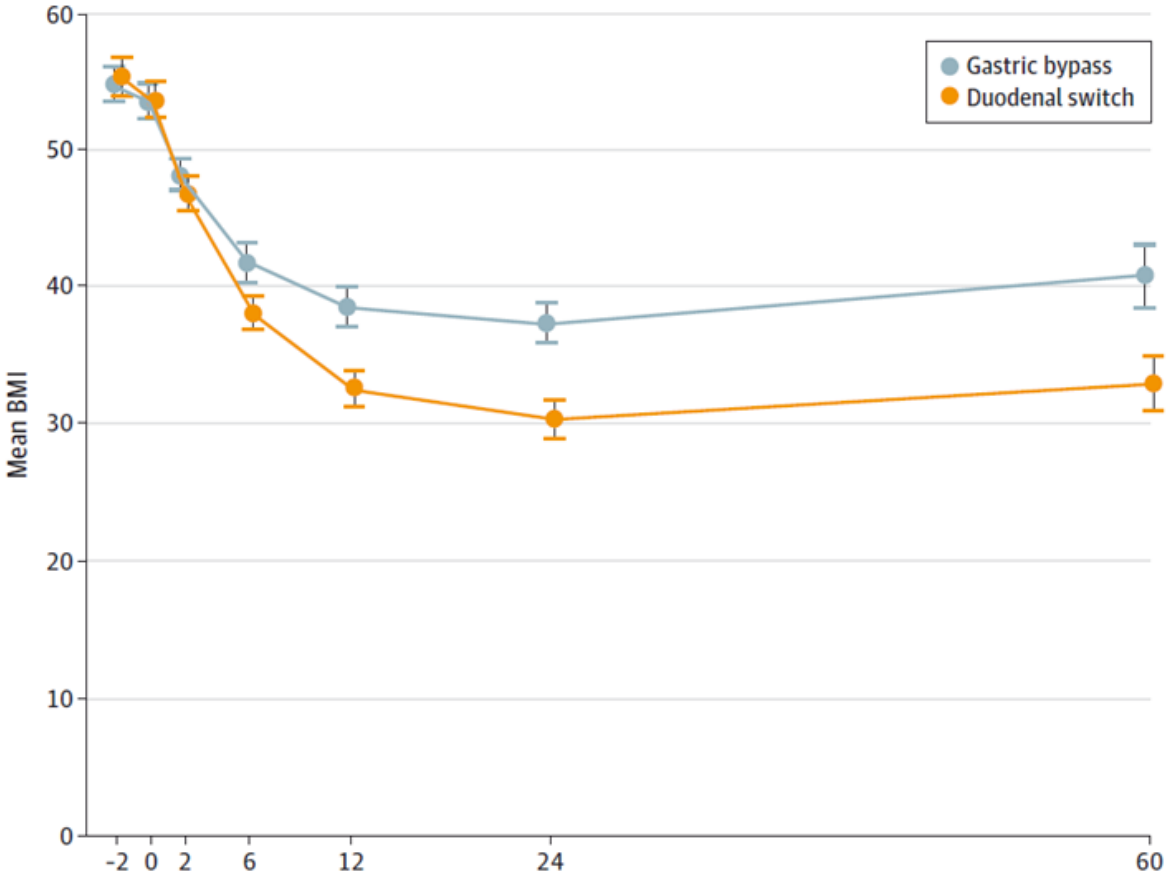
	SLEEVE	RYGB	DS
BMI	13.6	14.7	23.7
TWL %	23.6	26.3	38.4
Complication	8.7	4.7	12.9

Conclusions:

- BPD/DS is the most effective operation at long-term reduction of BMI
- SG and RYGB had similar results

Maroun J et al. Surg Endosc. 2022 Jul;36(7):4946-4955.

Figure 2. Observed Mean Body Mass Index (95% CI) at Each Time



No. of Patients							
Gastric bypass	31	31	31	31	31	31	27
Duodenal switch	29	28	29	29	28	27	28

Increasing Biliopancreatic Limb

Observational Study

Medicine®

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Should Roux-en-Y gastric bypass biliopancreatic limb length be tailored to achieve improved diabetes outcomes?

Mário Nora, MD[a], Tiago Morais, MSc[b], Rui Almeida, MD[b], Marta Guimarães, MD, PhD[a,b], Mariana P. Monteiro, MD, PhD[a,c,*]

Density of L cells increase progressively from 200 cm from the Treitz angle towards distal ileum.

Received: 6 February 2018 | Accepted: 23 April 2018
DOI: 10.1002/jcb.27062

RESEARCH ARTICLE

WILEY Journal of Cellular Biochemistry

Differential GIP/GLP-1 intestinal cell distribution in diabetics' yields distinctive rearrangements depending on Roux-en-Y biliopancreatic limb length

António M. Palha[1] | Sofia S. Pereira[1,2] | Madalena M. Costa[1] | Tiago Morais[1] | André F. Maia[2,3] | Marta Guimarães[1,4] | Mário Nora[4] | Mariana P. Monteiro[1]

Conversion of Proximal to Distal Gastric Bypass for Failed Gastric Bypass for Superobesity

Harvey J. Sugerman, M.D., John M. Kellum, M.D., Eric J. DeMaria, M.D.

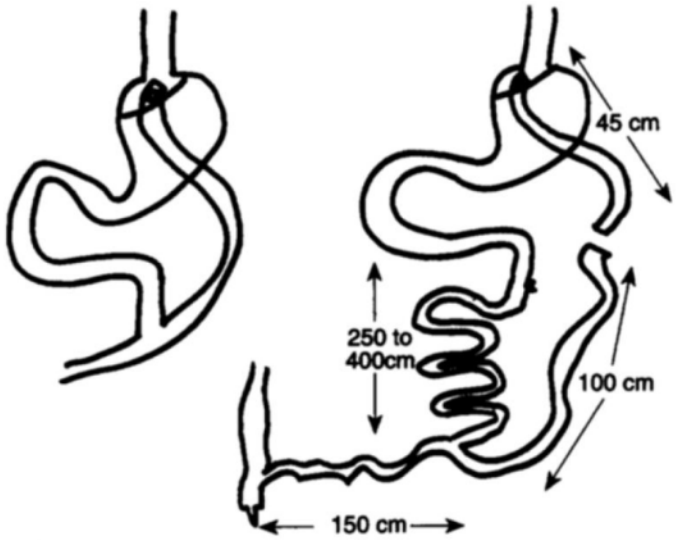


Fig. 1. Schematic of conversion of S-GBP to 150 cm D-GBP. Distal small bowel transected 250 cm from the ileocecal valve and proximal end anastomosed to the disconnected 45 cm Roux limb. Bypassed small bowel, or "biliopancreatic limb," anastomosed to the ileum at 150 cm from the ileocecal valve. This creates a 145 cm "alimentary limb," a 150 cm "common limb," and a 250 to 400 cm "biliopancreatic limb."

„Distal Gastric Bypass":

5 patients CC=50cm AL=295cm
All had to be revised (**severe malnutrition**)
3 died due to liver failure

22 patients AL=145cm; CC=150cm
3 had to be revised (malnutrition)

Journal of Gastrointestinal Surgery 1999;1:517-525

Conversion of standard Roux-en-Y gastric bypass to distal bypass for weight loss failure and metabolic syndrome: 3-year follow-up and evolution of technique to reduce nutritional complications

Saber Ghiassi, M.D., M.P.H.[a], Kelvin Higa, M.D.[b,*], Steven Chang, M.D.[b], Pearl Ma, M.D.[b], Aaron Lloyd, M.P.H.[b], Keith Boone, M.D.[b], Eric J. DeMaria, M.D.[c]

11p total alimentary limb length (TALL) of 250 to 300cm (7 had to be revised (malnutrition))

The subsequent 85 patients were converted to distal RYGB with **TALL 400 to 450cm** in a single-stage operation

Surgery forObesityandRelatedDiseases14(2018)554–561

Conversion of standard Roux-en-Y gastric bypass to distal bypass for weight loss failure and metabolic syndrome: 3-year follow-up and evolution of technique to reduce nutritional complications

Saber Ghiassi, M.D., M.P.H.[a], Kelvin Higa, M.D.[b,*], Steven Chang, M.D.[b], Pearl Ma, M.D.[b], Aaron Lloyd, M.P.H.[b], Keith Boone, M.D.[b], Eric J. DeMaria, M.D.[c]

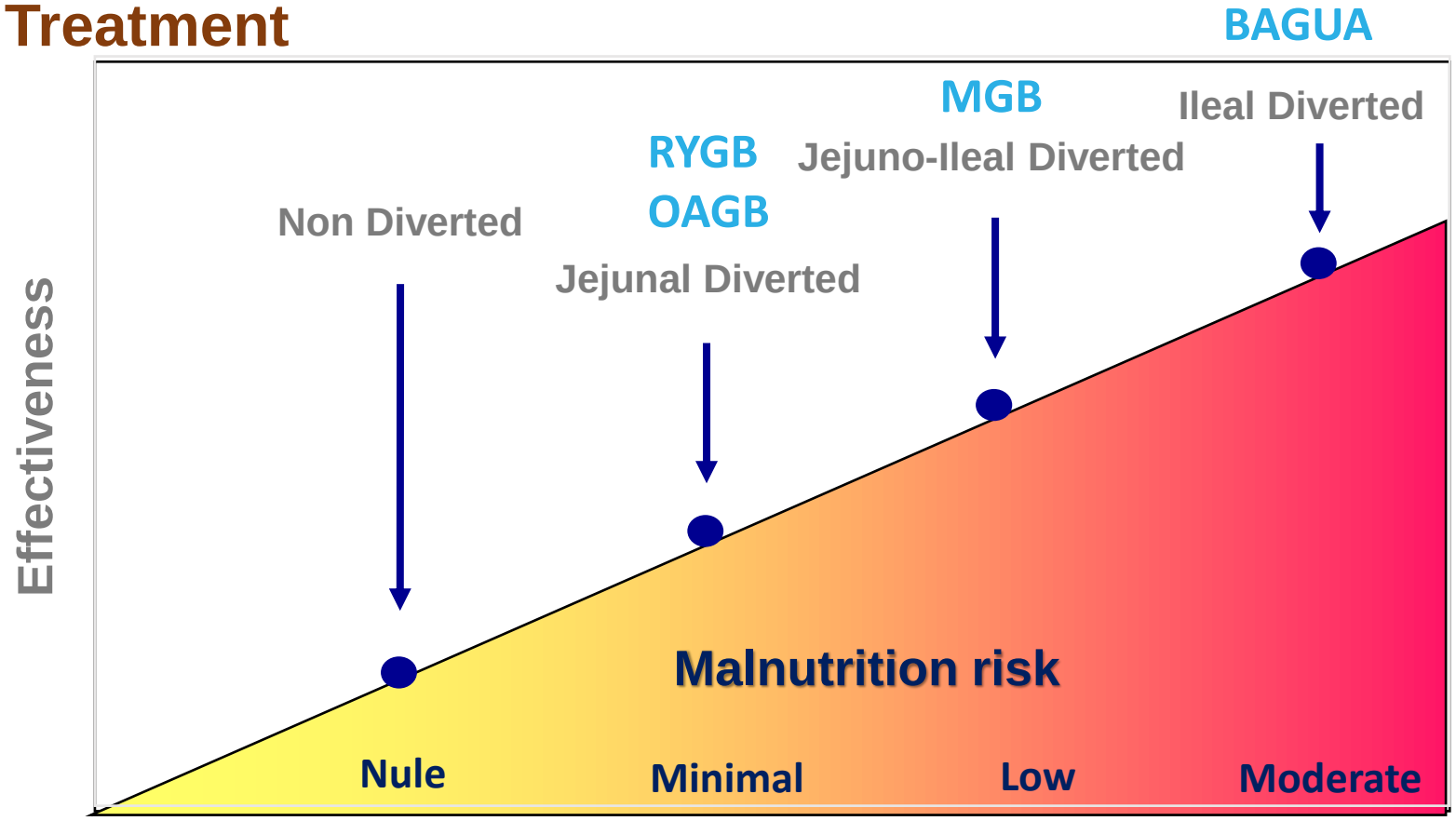
Diarrhea and protein calorie malnutrition with TALL of 250 to 300 cm,

whereas TALL 400 to 450 cm demonstrated a lower incidence of nutritional issues,

but the effect on calcium, parathyroid hormone, and the fat soluble vitamins A and D is still a major concern

Surgery forObesityandRelatedDiseases14(2018)554–561

Metabolic Surgery
Customizing the Treatment



GOC CENTRO DE OTIMIZAÇÃO METABÓLICA

Elias Ortiz & Company
MEXICO WEIGHT LOSS SPECIALISTS

Conclusion

Concerning the limbs in Gastric Bypass

- The shorter the AL, enough to avoid alkaline reflux, the better
- The lack of the AL in OAGB may be an advantage
- Results (Weight Loss and Metabolic) will depend on the level of gastroenterostomy divertion
- Gastrojejunostomy will be less effective than Gastroileostomy
- The more distal the Gastroenterostomy, higher the risk of severe nutritional deficiencies and diarrhea
- Actually we really don't know exactly how much we should divert
- Minimum TALL should be 4,5 m – Minimum CC should be 3 m
- Better to have some extra kilos than deficiency of albumin

Gracias!
Thank you!

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