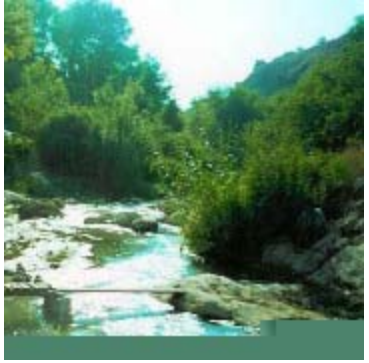




The 8th Annual Conference of the Lebanese Society of Family Medicine
October 25th 2009

Bariatric Surgery: The Primary Care Approach

Bassem Y. Safadi, MD, FACS

Associate Professor of Clinical Surgery
American University of Beirut

AUB American University of Beirut
الجامعة الأميركية في بيروت

Bariatric Surgery

- **bariatrics** bar·i·at·rics (bār'ē-āt'rĭks)
  n.
  The branch of medicine that deals with the causes, prevention, and treatment of obesity.
- **bar'i·at'ric** *adj.*
- Origin:
- 1965–70; < Gk bár(os) weight (cf. baro-) + -iatrics

Bariatric Surgery

- **The Primary Care Approach:**
  - When should bariatric surgery be done? (indications/patient selection)
  - The types of procedures?
  - The results, both good and bad?
  - Long-term follow-up?

Bariatric Surgery

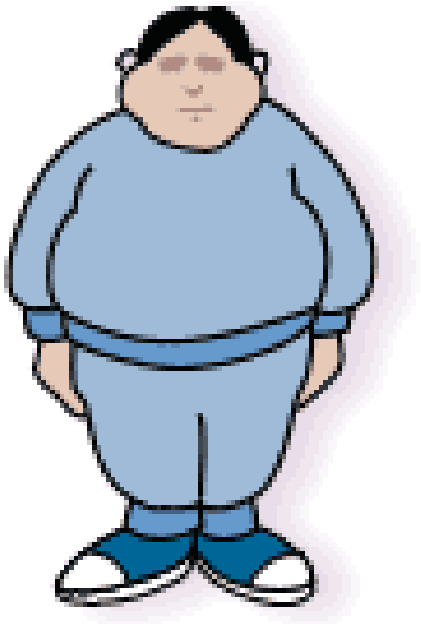
- **The Primary Care Approach:**
  - When should bariatric surgery be done? (indications/patient selection)
  - The types of procedures?
  - The results, both good and bad?
  - Long-term follow-up?

Bariatric Surgery: Indications / Patient Slection

- 1991 NIH Consensus
  - BMI > 40 kg/m2
  - BMI > 35 kg/m2 but with a serious co-morbidity: Diabetes, severe hypertension, obstructive sleep apnea, etc...
  - Several failed attempts at dieting: “patients seeking treatment for the first time should be considered” for a non-surgical program.

TREND:
Consider surgery for BMI 30-35 kg/m2 for diabetes treatment

Indications / Patient selection



Height 1.74 cm
Weight 120 kgs
BMI 40 kg/m2

Height 1.74 cm
Weight 105 kgs
BMI 35 kg/m2

Bariatric Surgery

- **The Primary Care Approach:**
  - When should bariatric surgery be done? (indications/patient selection)
  - The types of procedures?
  - The results, both good and bad?
  - Long-term follow-up?

Types of Procedures

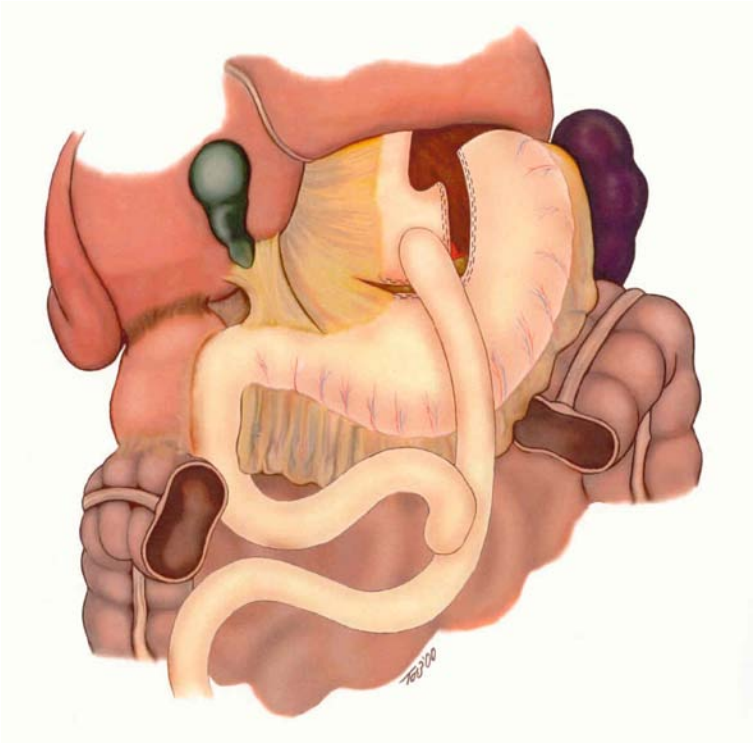
- Old and Almost Forgotten Ones:
  - Jejuno-ileal bypass
  - Vertical Banded Gastroplasty (VBG)
- Common Ones:
  - Lap Gastric Band
  - Gastric Bypass
  - Gastric Sleeve
- Uncommon Ones:
  - Duodenal Switch and Biliopancreatic Diversion

Old and Almost Forgotten

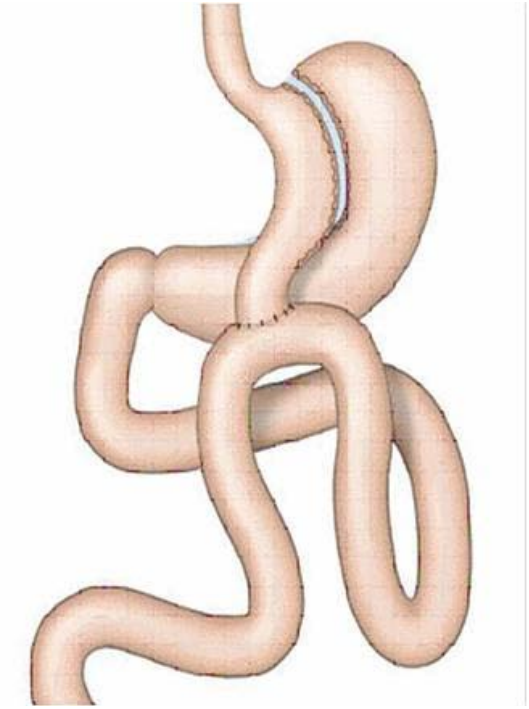
FIGURE 13
VERTICAL BANDED
GASTROPLASTY
(MASON)

FIGURE 2
JUJUNO-ILEAL
BYPASS (JIB)
END-TO-SIDE (PAYNE)

Common: Gastric Bypass

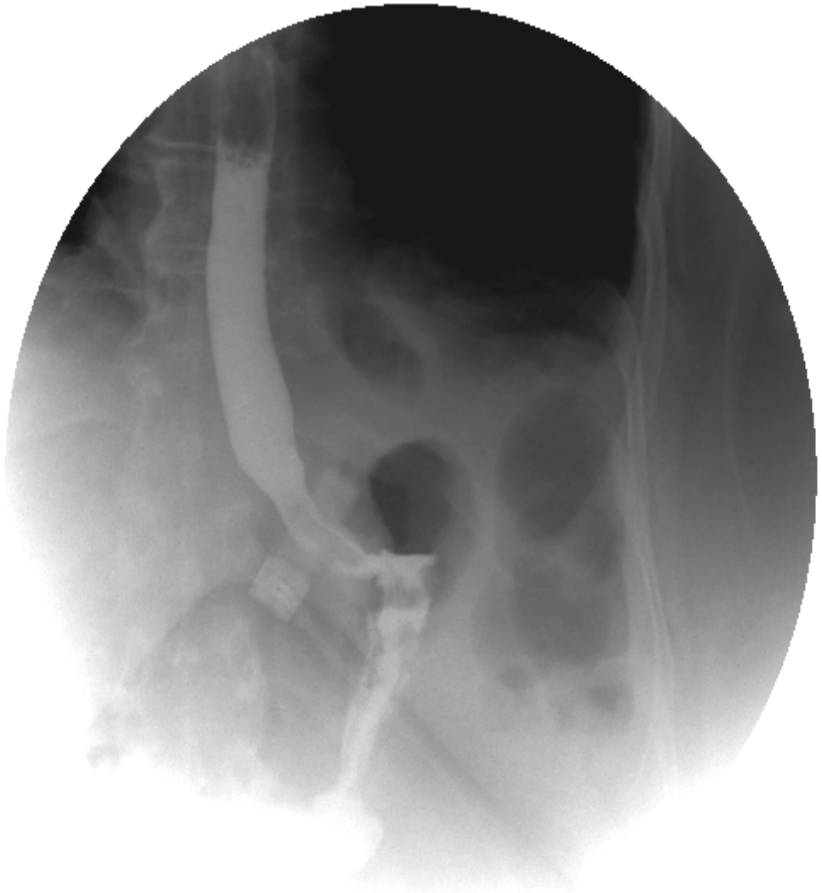


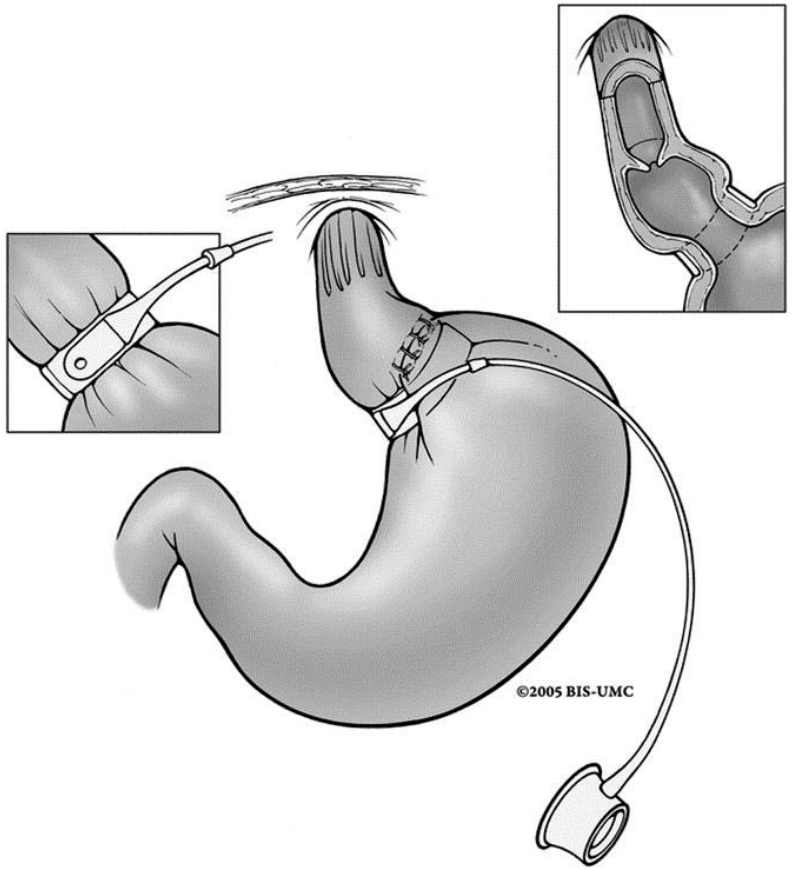
Standard Roux-y- Gastric Bypass



Mini-gastric bypass

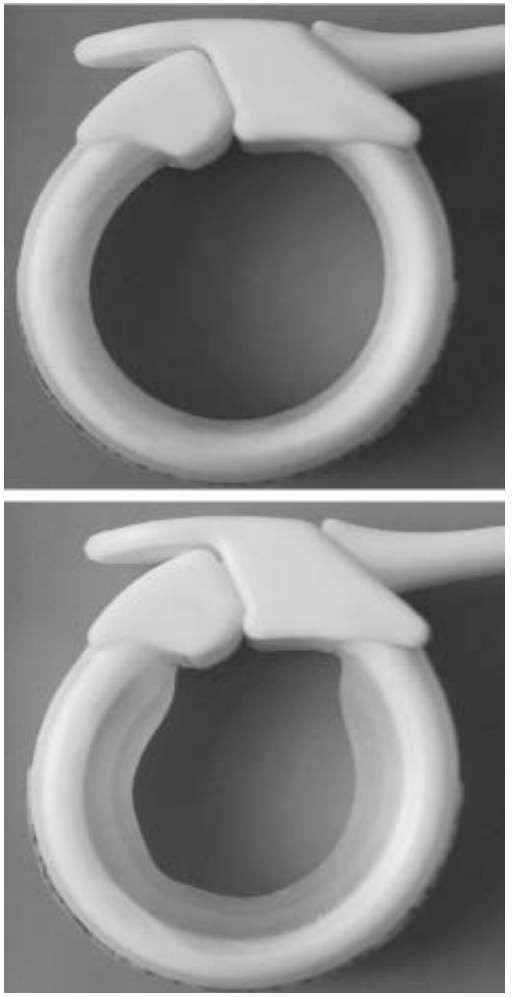
Common: Adjustable gastric band (Laparoscopic)



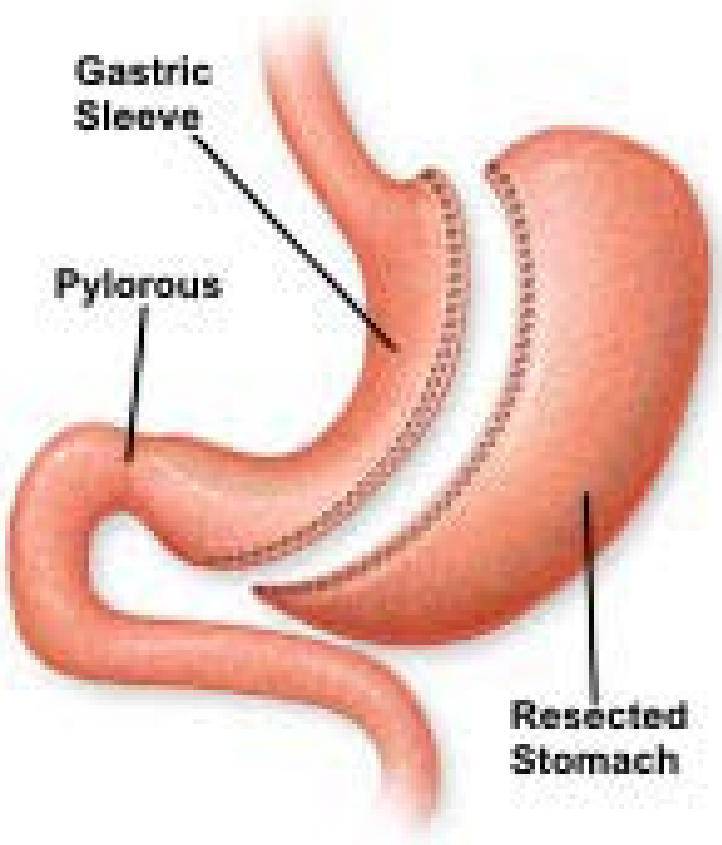


Common: Adjustable gastric band (Laparoscopic)

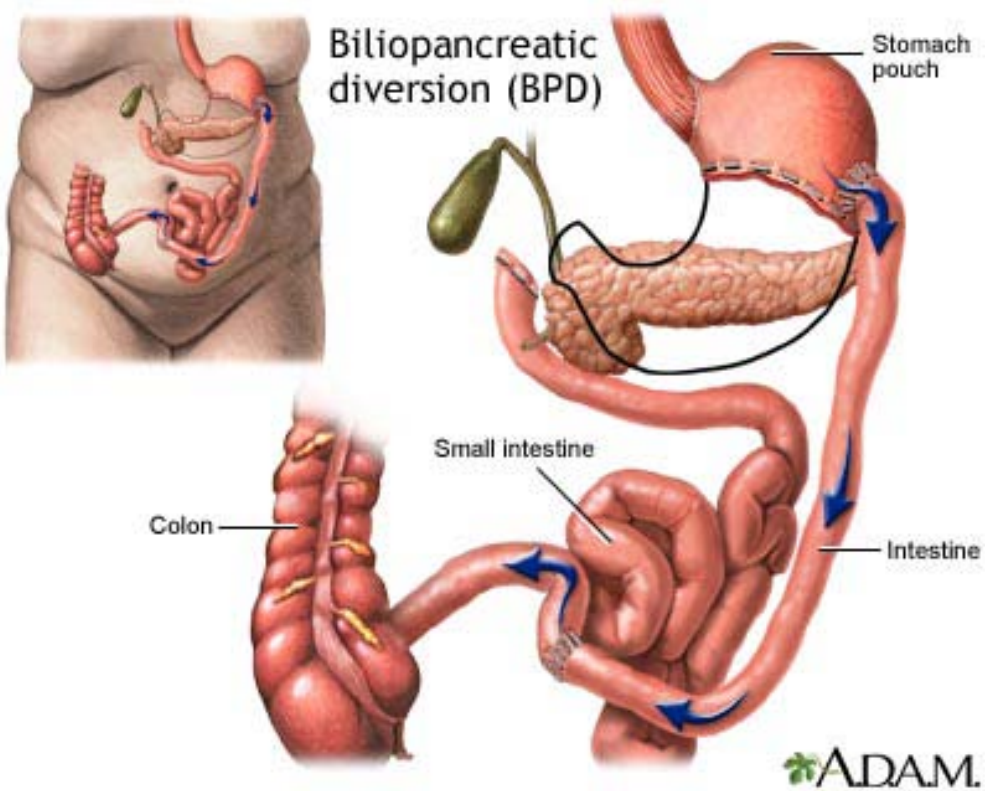
- Adjustable by percutaneous addition or removal of saline through the subcutaneous port

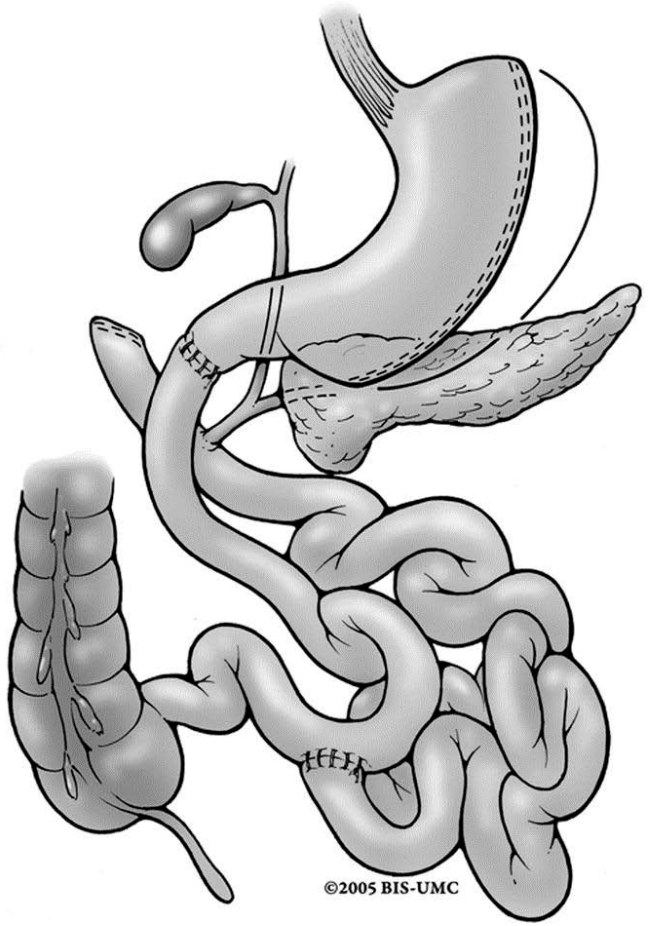


Common: Laparoscopic Sleeve Gastrectomy

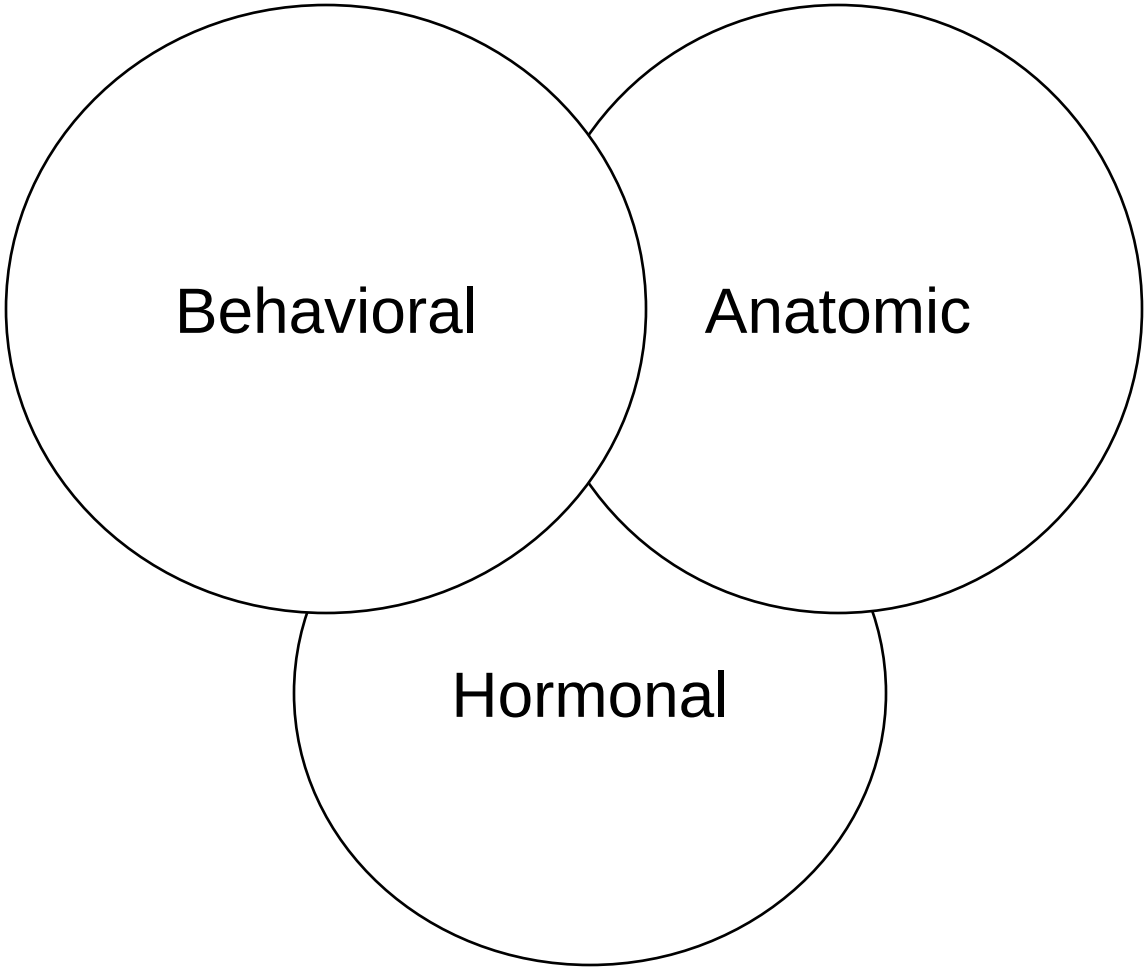


Uncommon: Malabsorptive

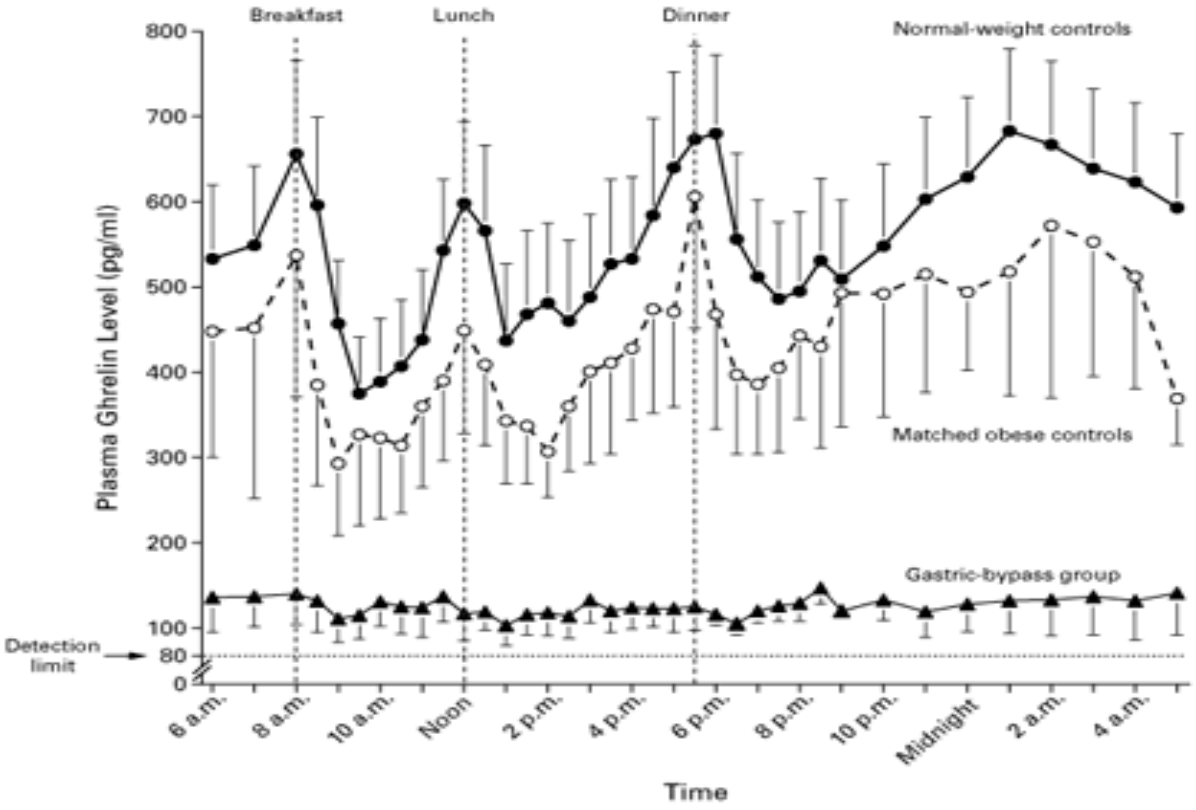




Restrictive vs. Mal-absorptive



RYGB: The role of Ghrelin



Plasma Ghrelin Levels after Diet-Induced Weight Loss or Gastric Bypass Surgery

Cummings et al, NEJM 346(21):1662, 2002

Bariatric Surgery

- **The Primary Care Approach:**
  - When should bariatric surgery be done? (indications/patient selection)
  - The types of procedures?
  - The results, both good and bad?
  - Long-term follow-up?

Comparing procedures

	Operative risk	%EWL	Long-term risk
Band	Lowest	40-60	Undetermined but may be high
Sleeve	Intermediate	50-60%	Undetermined but seems low
RYGB	Intermediate	60-70	intermediate
BPD and DS	Highest	70-80	Moderate

Bariatric Surgery

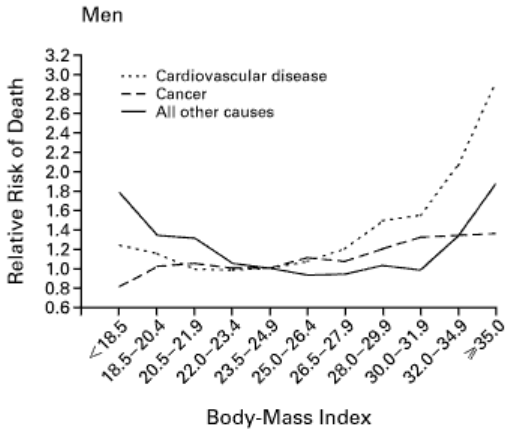
- **The Primary Care Approach:**
  - When should bariatric surgery be done? (indications/patient selection)
  - The types of procedures?
  - The results, both good and bad?
  - Long-term follow-up?

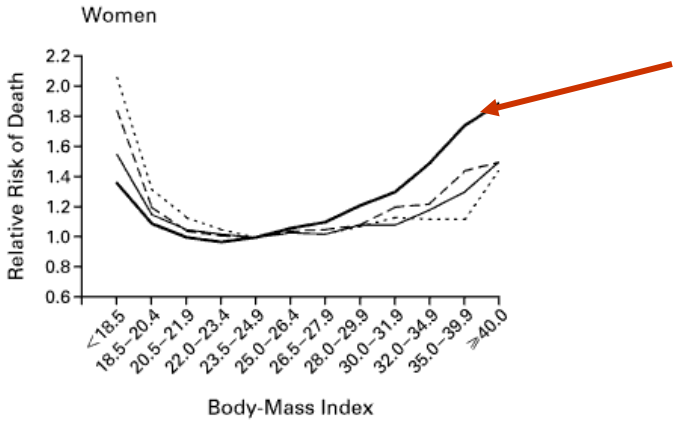
Obesity: A chronic disease

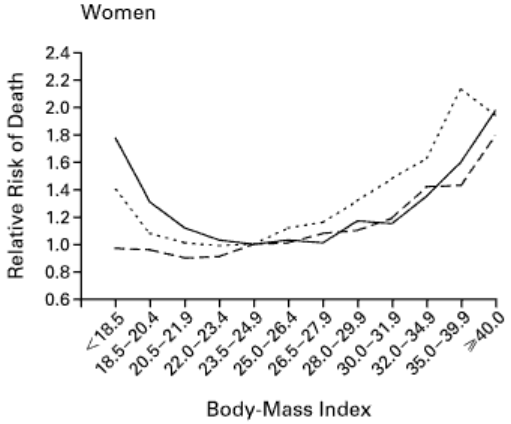
- Type 2 diabetes
- Hypertension
- Hyperlipidemia
- CAD, CHF, CVA
- PVD
- DVT and pulmonary embolism
- SLEEP APNEA
- Pulmonary HTN
- Edema, skin breakdown
- Venous stasis, ulcers

- Osteoarthritis
- Gastroesophageal reflux
- Gallbladder Disease
- Fatty Liver
- Menstrual irregularities
- Infertility
- Hypogonadism, ED, anorgasmia
- Urinary stress incontinence
- Pseudotumor cerebri

Obesity and risk of Premature Death







American Cancer Society Cancer Prevention Study II (1982)
Calle EE et al, N Engl J Med 1999; 341(15): 1097-1105

Efficacy for Improvement in Diabetes-Related Outcomes for All Patients

Table 5. Efficacy for Improvement in Diabetes-Related Outcomes for All Patients

	Diabetes Course			Chemistry Level		
	Resolved	Resolved or Improved	New or Worse	HbA_{1c}	Fasting Glucose, mmol/L	Fasting Insulin, pmol/L
Total Population*						
Patients evaluated	1846	485	1835	270	2092	1460
No. (%) with improvement in characteristic	1417 (76.8)	414 (85.4)	12 (0.7)			
No. of treatment groups	63	30			46	36
Mean (95% CI)	76.8% (70.7% to 82.9%)	86.0% (		-0.55% to -0.24%)	-0.74 (-0.88 to -0.60)	-117.50 (-136.10 to -98.89)
P Value for heterogeneity	<.01	<.01			<.01	<.01
Weighted mean change (range)				-0.60% to 0)	-0.86 (-4.77 to 0.49)	-114.57 (-269.10 to -42.0)
Gastric Banding						
Patients evaluated	205	217	521	237	289	166
No. (%) with improvement in characteristic	98 (47.8)	174 (80.2)				
No. of treatment groups	9	9			14	10
Mean (95% CI)	47.9% (29.1% to 66.7%)	80.8% (72.2% to 89.4%)			0.78 (-1.05 to -0.51)	-79.72 (-99.57 to -59.87)
P Value for heterogeneity	<.01	<.10		NS†	<.01	<.01
Weighted mean change (range)				-0.29% (-0.40% to -0.26%)	-0.71 (-1.80 to -0.20)	-77.07 (-171.50 to -46.40)
Gastric Bypass‡						
Patients evaluated	989	127	1142	20	196	93
No. (%) with improvement in characteristic	829 (83.8)	115 (90.6)	6 (0.5)			
No. of treatment groups	26	6	3	2	9	6
Mean (95% CI)	83.7% (77.3% to 90.1%)	93.2% (79.3% to 100.0%)		-0.59% (-0.82% to -0.37%)	-1.25 (-1.52 to -0.97)	-121.26 (-137.31 to -105.20)
P Value for heterogeneity	<.01	<.01		NS†	<.01	
Weighted mean change (range)				-0.42% (-0.60% to 0)	-1.43 (-1.80 to -0.70)	-118.32 (-173.60 to -107.60)
Gastroplasty						
Patients evaluated	66	38	15		326	334
No. (%) with improvement in characteristic	45 (68.2)	34 (89.5)	1 (6.7)			
No. of treatment groups	11	8	1		12	12
Mean (95% CI)	71.6% (55.1% to 88.2%)	90.8% (76.2% to 100.0%)			-0.44 (-0.58 to -0.30)	-109.57 (-138.15 to -80.98)
P Value for heterogeneity	<.10				<.10	<.01
Weighted mean change (range)					-0.56 (-4.77 to 0)	-122.92 (-190.10 to -42.0)
Biliopancreatic Diversion or Duodenal Switch						
Patients evaluated	288	1			89	87
No. (%) with improvement in characteristic	282 (97.9)	89 (88.1)				
No. of treatment groups	9	6			6	6
Mean (95% CI)	98.9% (96.8% to 100.0%)	76.7% (42.2% to 100.0%)§			-0.59 (-1.06 to -0.11)	-148.53 (-213.69 to -83.36)
P Value for heterogeneity	NS†	<.01			<.01	<.01
Weighted mean change (range)					-0.67 (-1.41 to 0.49)	-132.51 (-269.10 to -73.40)

85.4%

80.2%

90.6%

88.1%

Abbreviations: CI, confidence interval; HbA_{1c}, glycosylated hemoglobin.
SI conversion factors: To convert glucose to mg/dL, divide by 0.0555; insulin to μIU/mL, divide by 6.945.
*Includes gastric banding, gastric bypass, gastroplasty, biliopancreatic diversion or duodenal switch, as well as mixed groups and other less common procedures (biliary intestinal bypass, ileogastrostomy, jejunoileal bypass, and unspecified bariatric surgery).
†Comparison across studies not significant for heterogeneity.
‡Includes standard and long-limb gastric bypass and gastric bypass procedures with additional components (eg, gastroplasty, band).
§Lower percentage (compared with resolved category) reflects several large studies reporting only number of patients with diabetes resolution, which are not included in this category.

Buchwald, H. et al. JAMA 2004;292:1724-1737.

Efficacy for Improvement in Hypertension and Obstructive Sleep Apnea by Surgical Procedure

Table 8. Efficacy for Improvement in Hypertension and Obstructive Sleep Apnea by Surgical Procedure

	Hypertension		Obstructive Sleep Apnea		
	Resolved	Resolved or Improved	Resolved	Resolved or Improved	Decrease in Apneas or Hypopneas per Hour
Total Population*					
Patients evaluated	4805	2141	1195	726	92
No. (%) with improvement in characteristic	3151 (65.6)	1752 (81.8)	1051 (87.9)	585 (80.6)	
No. of gr			38	24	4
Mean		to 86.1%)	85.7% (79.2%		−33.85 (−50.23 to −17.47)
P Valu he			<.01		<.01
Weigh change (range)					−40.09 (−52.80 to −16.0)
Gastric Banding					
Patients evaluated	604	685	56		
No. (%) with improvement in characteristic	232 (38.4)	490 (71.5)	53 (94.6)		
No. of treatment groups	12	10	5	3	
Mean (95% CI)	43.2% (30.4% to 55.9%)	70.8% (61.9% to 79.6%)	95.0% (88.8% to 100.0%)	68.0% (26.2% to 100.0%)	
P Value for heterogeneity	<.01	<.01	NS†	<.10	
Gastric Bypass‡					
Patients evaluated	2115	435	896	176	31
No. (%) with improvement in characteristic	1594 (75.4)	379 (87.1)	776 (86.6)	167 (94.9)	
No. of treatment groups	20	11	13	6	2
Mean (95% CI)	67.5% (58.4% to 76.5%)	87.2% (78.4% to 95.9%)	80.4% (68.4% to 92.3%)	94.8% (91.5% to 98.1%)	−31.64 (−44.15 to −19.13)
P Value for heterogeneity	<.01	<.01	<.01	NS†	NS†
Weighted mean change (range)					−31.71 (−33.0 to −31.0)
Gastroplasty					
Patients evaluated	382	103	43	28	
No. (%) with improvement in characteristic	277 (72.5)	83 (80.6)	33 (76.7)	25 (89.3)	
No. of treatment groups	20	12	10	6	
Mean (95% CI)	69.0% (59.1% to 79.0%)	85.4% (74.1% to 96.7%)	78.2% (53.6% to 100.0%)	90.7% (78.5% to 100.0%)	
P Value for heterogeneity	<.01	<.01	<.01	NS†	
Biliopancreatic Diversion or Duodenal Switch					
Patients evaluated	774	782	165	166	
No. (%) with improvement in characteristic	629 (81.3)	718 (91.8)	157 (95.2)	144 (86.7)	
No. of treatment groups	7	7	6	6	
Mean (95% CI)	83.4% (73.2% to 93.6%)	75.1% (44.7% to 100.0%)	91.9% (81.9% to 100.0%)	71.2% (34.5% to 100.0%)	
P Value for heterogeneity	<.10	<.01	<.01	<.01	

Abbreviation: CI, confidence interval.
*Includes gastric banding, gastric bypass, gastroplasty, biliopancreatic diversion or duodenal switch, as well as mixed groups and other less common procedures (biliary intestinal bypass, ileogastrostomy, jejunoileal bypass, and unspecified bariatric surgery).
†Comparison across studies not significant for heterogeneity.
‡Includes standard and long-limb gastric bypass and gastric bypass procedures with additional components (eg, gastroplasty, band).

Htn: 81.8%

OSA: 80.6%

Buchwald, H. et al. JAMA 2004;292:1724-1737.

JAMA

RYGB: Long-term Results

- Mean % loss of excess body weight: 62.4% at 1 year and 50% at 14 years
- Mean FBS level fell from 187 mg/dl to a minimum of 98.9 at one year and remained < 140 mg/dl out to 10 years.

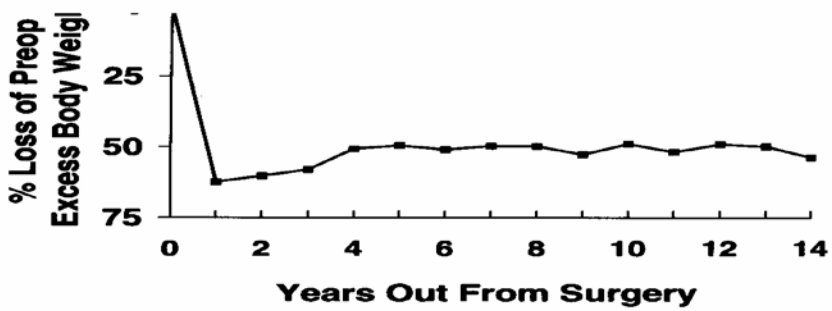


Fig. 3. Percentage of excess body weight lost in the surgical group (n = 154). The mean percentage loss of excess body weight reached a maximum of 62.4% 1 year after gastric bypass and remained at approximately 50% out to 14 years.

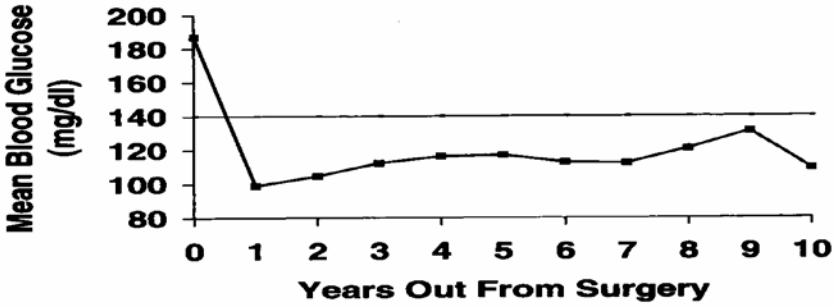
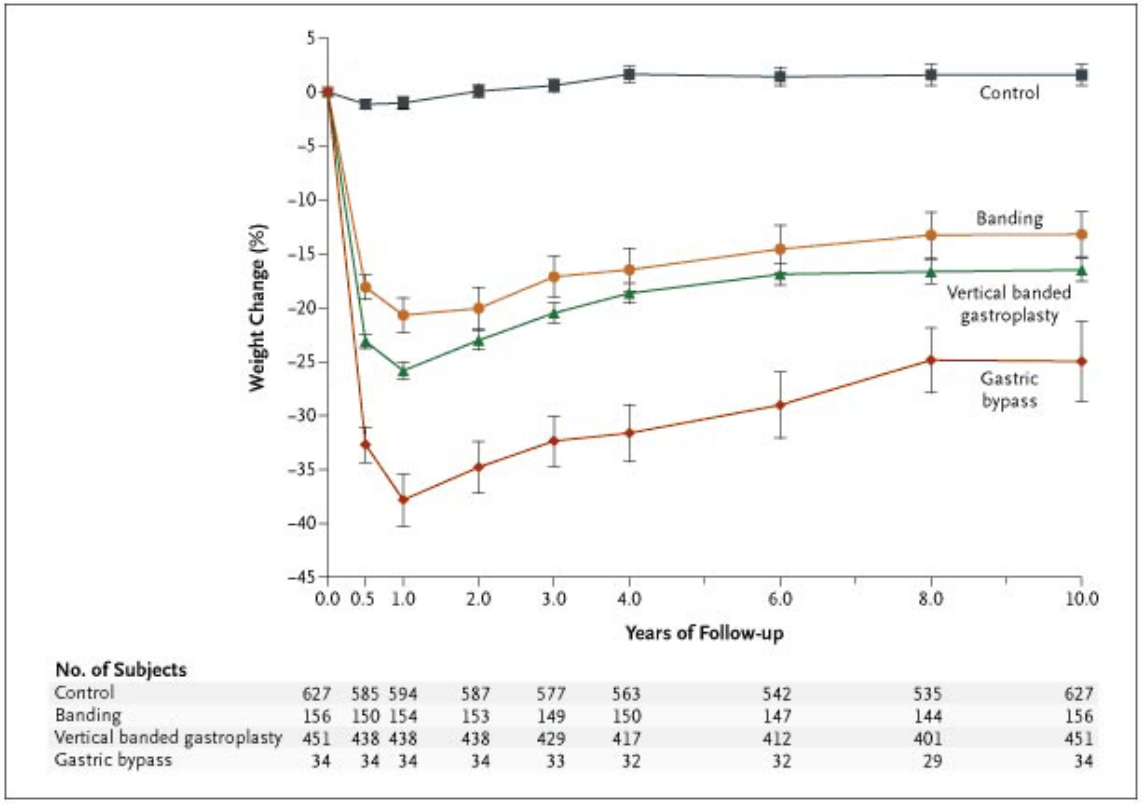


Fig. 4. The mean blood glucose level fell from 187 mg/dl (all fasting) to a minimum of 98.9 mg/dl (combination of random and fasting) at 1 year after surgery, and then remained less than 140 mg/dl out to 10 years.

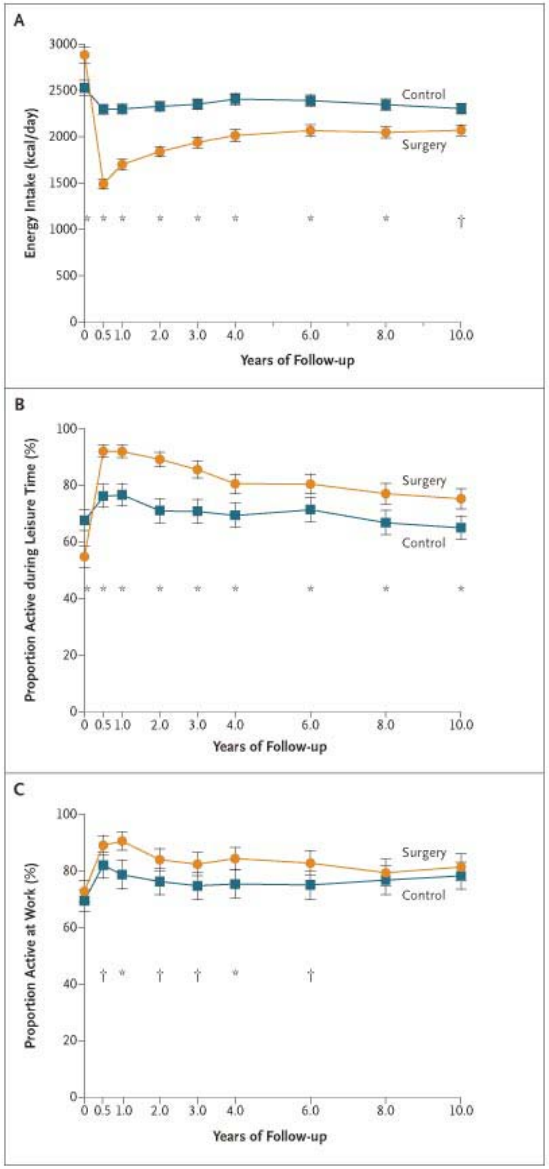
MacDonald J Gastrointest Surg 1997

Swedish Obese Subjects (SOS) Trial

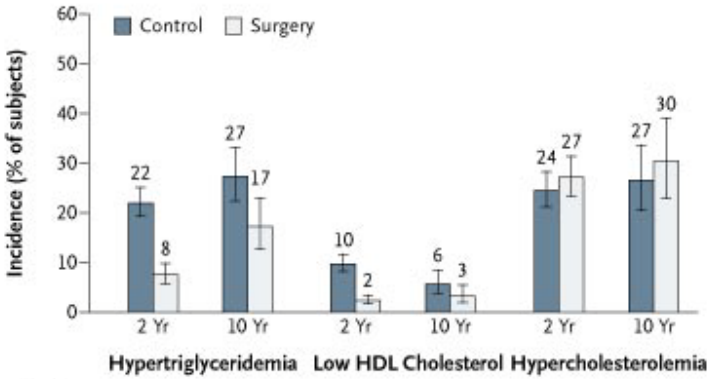
prospective, nonrandomized, intervention trial involving 4047 obese subjects (851 surgical patients at 10 years)



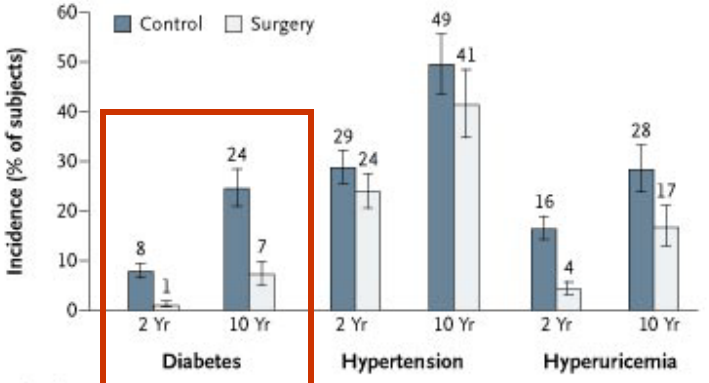
No. of Subjects									
Control	627	585	594	587	577	563	542	535	627
Banding	156	150	154	153	149	150	147	144	156
Vertical banded gastroplasty	451	438	438	438	429	417	412	401	451
Gastric bypass	34	34	34	34	33	32	32	29	34



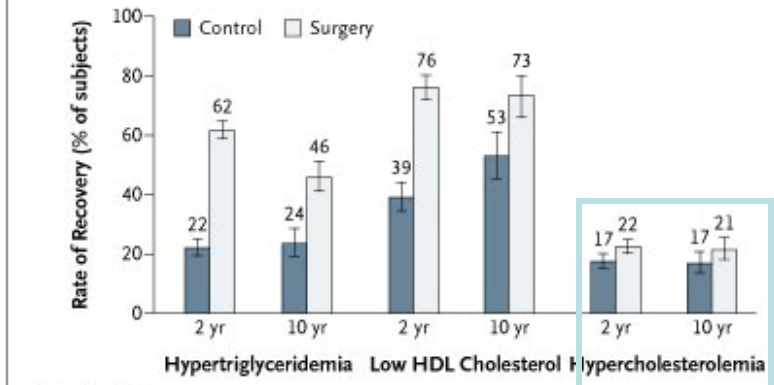
N Engl J Med. 2004 Dec 23;351(26):2683-93.



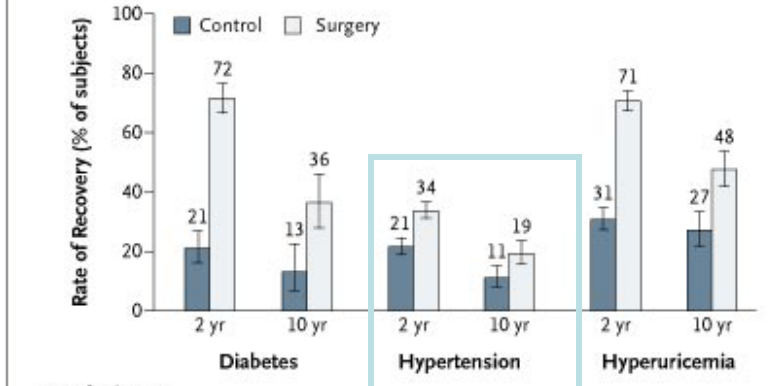
No. of subjects						
Control	801	281	1174	440	596	188
Surgery	731	225	1293	431	504	135
Odds ratio	0.29	0.61	0.21	0.57	1.27	1.16
95% CI	0.21–0.41	0.39–0.95	0.14–0.32	0.29–1.15	0.95–1.69	0.69–1.95
P value	<0.001	0.03	<0.001	0.12	0.11	0.57



No. of subjects						
Control	1402	539	770	279	1017	382
Surgery	1489	517	623	215	1044	342
Odds ratio	0.14	0.25	0.78	0.75	0.22	0.49
95% CI	0.08–0.24	0.17–0.38	0.60–1.01	0.52–1.08	0.15–0.31	0.34–0.71
P value	<0.001	<0.001	0.06	0.13	<0.001	<0.001



No. of subjects						
Control	850	331	396	166	1048	435
Surgery	1102	402	445	169	1327	498
Odds ratio	5.28	2.57	5.28	2.35	1.22	1.30
95% CI	4.29–6.49	1.85–3.57	3.85–7.23	1.44–3.84	0.98–1.51	0.92–1.83
P value	<0.001	<0.001	<0.001	0.001	0.07	0.14



No. of subjects						
Control	248	84	880	342	637	243
Surgery	342	118	1204	424	792	292
Odds ratio	8.42	3.45	1.72	1.68	5.36	2.37
95% CI	5.68–12.5	1.64–7.28	1.40–2.12	1.09–2.58	3.23–6.78	1.61–3.47
P value	<0.001	0.001	<0.001	0.02	<0.001	<0.001

TABLE 4. Five-Year Morbidity and Mortality

	Cohort							
	Bariatric Surgery		Controls		Relative Risk Reduction			
Condition/disease	**n**	**%**	**n**	**%**	**Estimate**	**95%**	**CI**	***P* Value**
Blood and blood-forming organs	4	0.39	41	0.72	0.54	0.19	1.50	0.230
Cancer	21	2.03	487	8.49	0.24	0.17	0.39	0.001
Cardiovascular and circulatory	49	4.73	1530	26.69	0.18	0.12	0.22	0.001
Digestive	377	36.43	1414	24.66	1.48	1.42	1.78	0.001
Endocrinological	98	9.47	1566	27.25	0.35	0.32	0.38	0.001
Genitourinary	77	7.44	551	9.61	0.77	0.63	0.97	0.027
Infectious diseases	90	8.70	2140	37.33	0.23	0.17	0.25	0.001
Musculoskeletal	50	4.83	682	11.90	0.41	0.32	0.55	0.001
Nervous system	25	2.42	228	3.98	0.61	0.44	0.93	0.010
Psychiatric and mental	45	4.35	470	8.20	0.53	0.41	0.73	0.001
Respiratory	28	2.71	651	11.36	0.24	0.17	0.36	0.001
Skin	38	3.67	305	5.32	0.69	0.48	0.96	0.027
Mortality	7	0.68	354	6.17	0.11	0.04	0.27	0.001

Christou NV, Sampalis JS, Liberman M, Look D, Auger S, McLean AP, MacLean LD. Surgery decreases long-term mortality, morbidity, and health care use in morbidly obese patients. Ann Surg. 2004

Follow-up and the Primary Care Physician

- Bariatric Surgical patients should have close follow-up
  - Vitamin deficiencies: B-12, Vit D, thiamine
  - Psychological and social
  - Cosmetic: redundant skin, hair loss
  - Long-term complications: gall stones, small intestinal obstruction, band problems, weight regain,…
  - Pregnancy

Conclusion

- Bariatric surgery is an excellent option for treating morbidly obese patients who failed medical treatment
- Diabetes and other serious medical problems can be cured or greatly improved with surgery
- Centers offering bariatric surgery should have expertise and follow patients closely