

## ***OBESITÀ E DISTURBI DEL COMPORTAMENTO ALIMENTARE***

### ***Indicazioni alla Chirurgia e Tecniche Chirurgiche***

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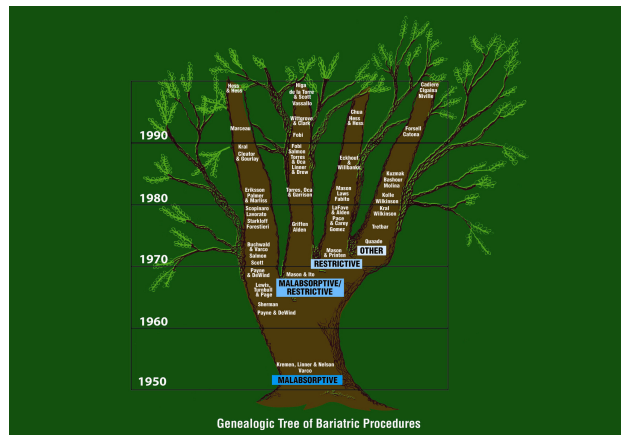
*Udine, 4 Ottobre 2008*

*Indications to Bariatric Surgery  
(NIH Consensus Development Conference Statement)  
Bethesda, March 25-27, 1991.*

- *BMI > 40 kg/m<sup>2</sup>  
(BMI > 35 kg/m<sup>2</sup> if complicated obesity).*
- *Age : 18-60 years.*
- *Longstanding obesity (> 5 years).*
- *Previous failure of medical therapy.*
- *Able to participate to long-term follow-up.*

Am J Clin Nutr 1992;55:615S

## EVOLUTION OF BARIATRIC SURGERY



Henry Buchwald  
Minneapolis, Minnesota, 2007

## Opzioni in chirurgia bariatrica

*Procedure Endoscopiche: Palloncino Intragastrico*

*Interventi Restrittivi*

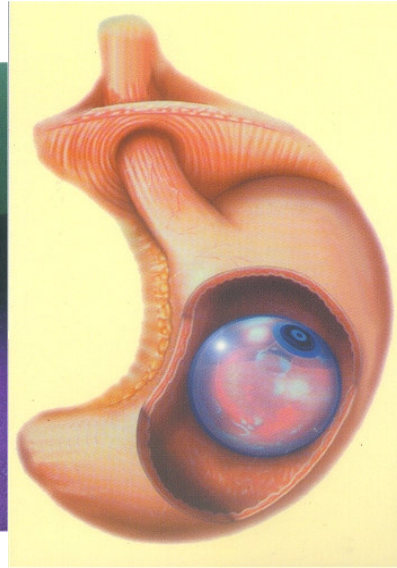
- Gastroplastica Verticale
- Bendaggio Gastrico

*Interventi Restrittivi-Malassorbitivi*

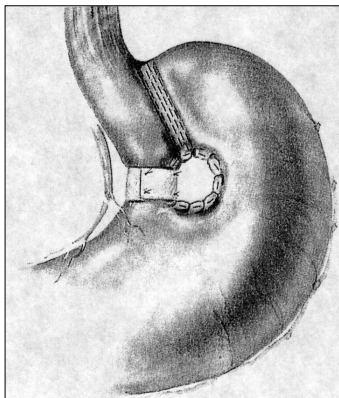
- Bypass Gastrico
- Diversione Biliopancreatica

*Altri Interventi: Bypass Gastrico Funzionale, Bandinaro, Sleeve Gastrectomy, Pacemaker Gastrico*

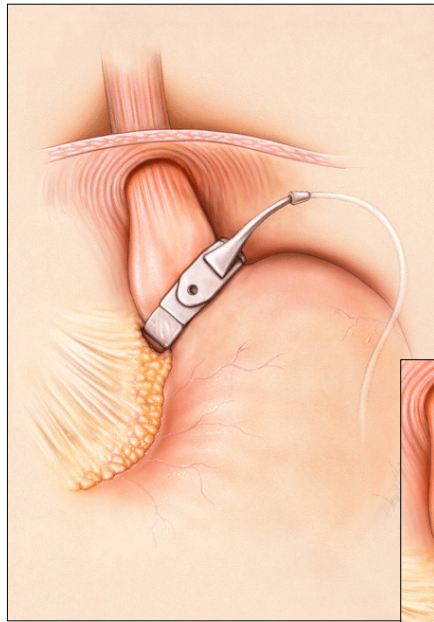
## ***Intragastric Balloon***



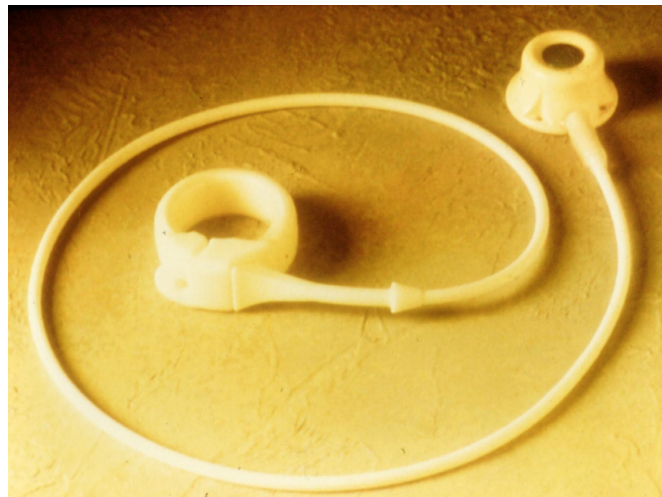
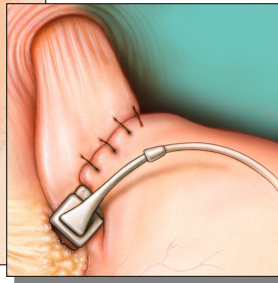
## **Gastroplastica Verticale**



- " Vomito frequente
- " Esofagite
- " Erosione – Stenosi Stoma
- " Deiscenza sutura gastrica
- " Fistola gastro-gastrica
- " Recupero ponderale



**Lap Band**

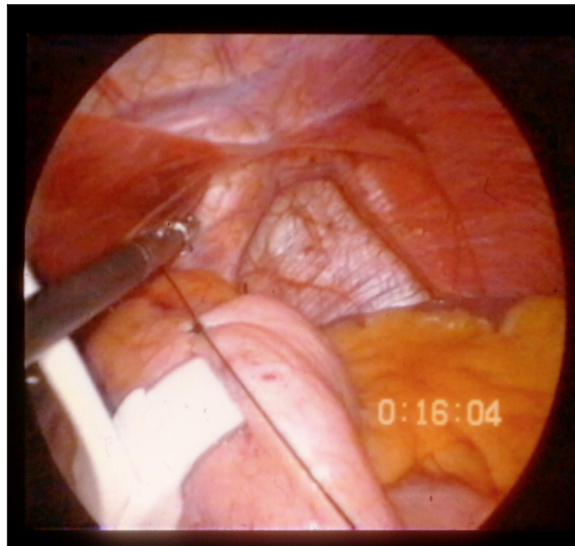


## Lap Band: Key points

### Embedment of the Band (retention sutures)

Standardized from Pat.n.3 (Nov '93)

## Lap Band: Key points

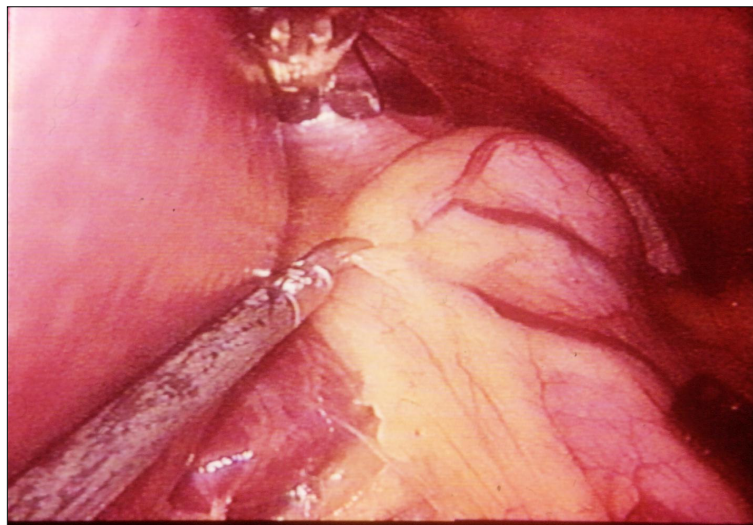


## Lap Band: Key points

**Reference points for dissection  
(equator of the balloon: left crus)**

Standardized from Pat.n.13 (Sept. '94)

## Lap Band: Key points



## Lap Band: Key points

**Virtual pouch**  
(based on a 25 ml measurement)

Standardized from Pat.n.27 (Feb.'95)

## Lap Band: Key points



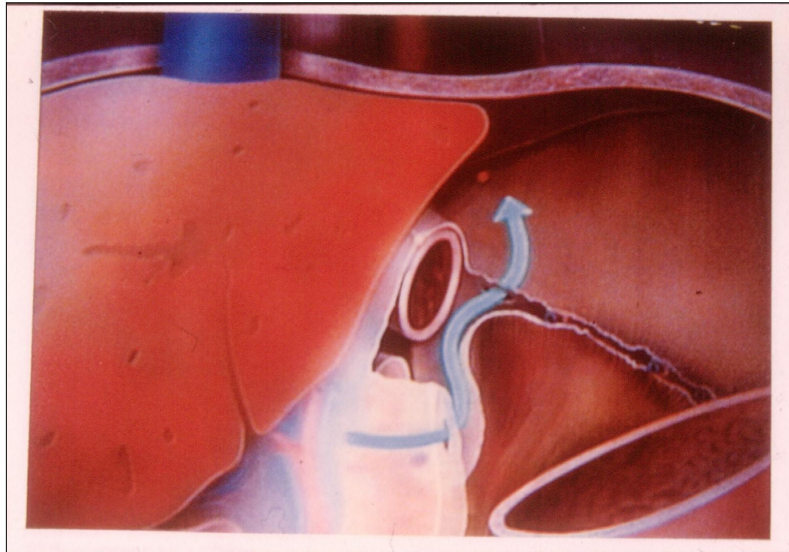


## Lap Band: Key points

**Retrogastric tunnel above the  
peritoneal reflection of bursa  
omentalis**

Standardized from Pat.n.48 (May.'95)

## Lap Band: Key points

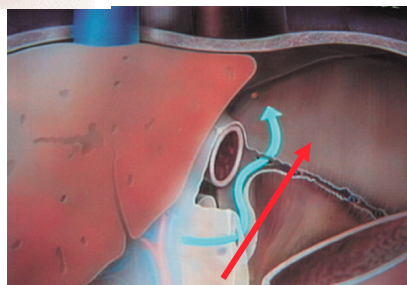
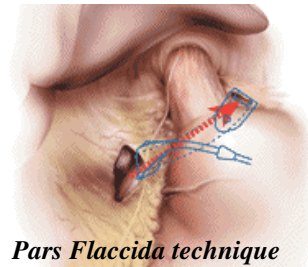
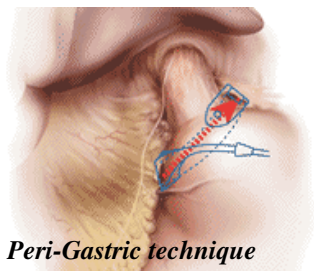




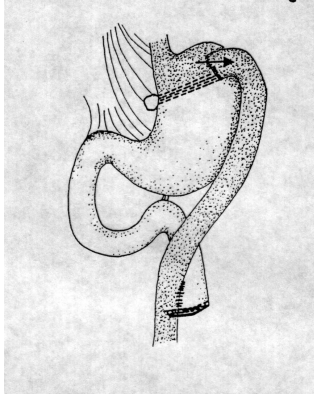
## Modification of the technique

Initial Approach	Current Approach
3cm below EG	1cm below EG
Greater curve dissection 1st short gastric	Greater curve dissection at Angle of His
Lesser curve dissection: <u>perigastric</u>	Lesser curve dissection: <u>pars flaccida</u>
Gastrostomometer to determine initial inflation	Not used, band left empty
Gastric pouch 25-30cc	“Virtual” pouch just below EG

## *Change in technique to prevent posterior slippages*

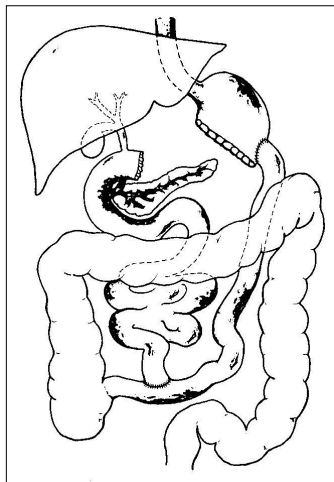


## **Bypass Gastrico**



- " **Esofagite**
- " **Dumping Syndrome**
- " **Deficit di ferro**
- " **Vit B12,A,D,E, acido folico**
- " **Ulcera peptica**
- " **Occlusione dell'Outlet**
- " **Occlusione intestinale**

## **Diversione Biliopancreatica**



- " **Ulcera dello Stoma**
- " **Occlusione Intestinale**
- " **Pancreatite acuta**
- " **Diarrea - Steatorrea**
- " **Anemia sideropenica**
- " **Neuropatia**
- " **Encefalopatia Wernicke**
- " **Malnutrizione proteica**
- " **Demineralizzazione**

## Valutazione delle opzioni Complicanze chirurgiche tardive

- **LAP-BAND :**
  - Erosione (0.5%)
  - Dilatazione Tasca/Scivolamento (2.8 %)
- **BYPASS GASTRICO :**
  - Occlusione Outlet (Funzionale 7.6% o Anatomica 3.4%)
  - Ulcera peptica (1-25%)
  - Occlusione del piccolo intestino (4.7%)
- **DIVERSIONE BILIOPANCREATICA :**
  - Ulcera dello Stoma (3.2%)
  - Occlusione Intestinale (1%)

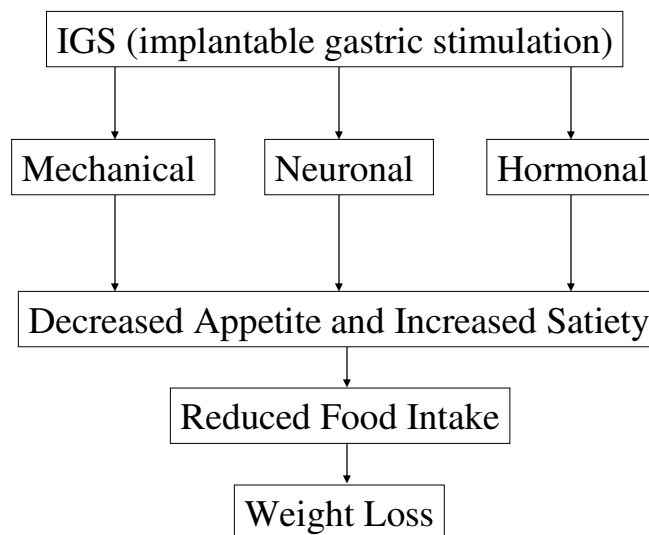
## Valutazione delle opzioni Complicanze nutrizionali

- **LAP-BAND :**
  - Vomito e Intolleranza al cibo solido.
- **BYPASS GASTRICO :**
  - Vomito, Dumping Syndrome, Diarrea, Ipoglicemia.
  - Deficit di ferro, Vitamine B12-A-D-E, Acido Folico.
- **DIVERSIONE BILIOPANCREATICA :**
  - Vomito, Diarrea, Steatorrea.
  - Anemia da deficit di ferro.
  - Deficit vitaminici gravi (Neuropatia - Wernicke).
  - Malnutrizione Proteica (15.1%  $\Rightarrow$  3.0%).
  - Demineralizzazione ossea.

# Implantable Gastric Stimulation



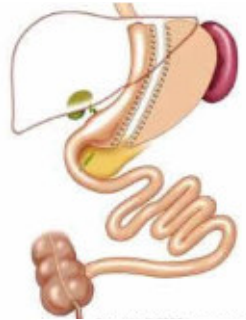
## Hypothesized Mechanisms of Action



## *Sleeve Gastrectomy*

### ***Position Statements:***

- ***Selected Patients (High risk and Super-Super Obesity)***
- ***Staged Bariatric Surgery***
- ***Lack of Published Evidence beyond 3 years***

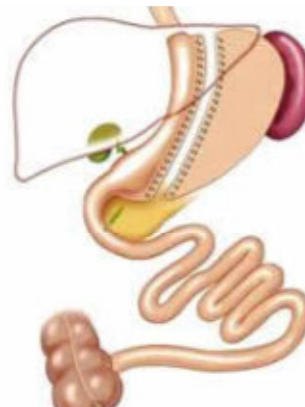


*ASMBS (American Society for Metabolic & Bariatric Surgery)  
Executive Council June 17, 2007*

## *Sleeve Gastrectomy*

### ***Weight Loss due to:***

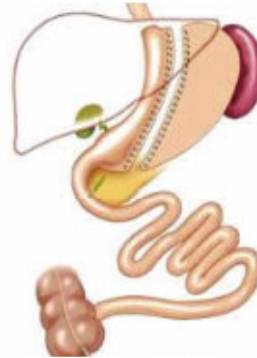
- ***Gastric restriction***
- ***Neurohumoral changes***



*ASMBS (American Society for Metabolic & Bariatric Surgery)  
Executive Council June 17, 2007*

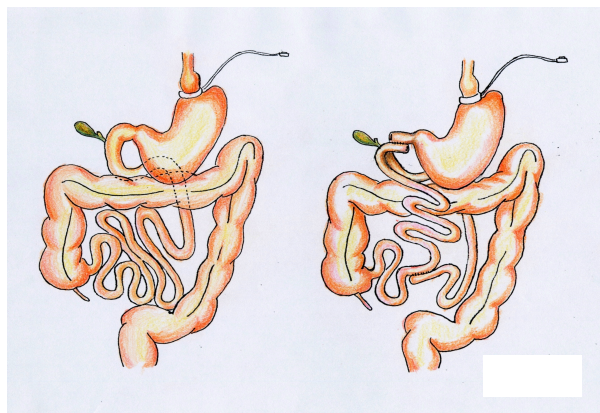
## *Sleeve Gastrectomy*

- 15 published Reports
- A single study provides data up to 3 years
- EWL ranging from 33% to 83%
- Major complication ranging from 0% to 24%



*ASMBS (American Society for Metabolic & Bariatric Surgery  
Executive Council June 17, 2007*

## *Bandinaro*





*Which Surgery  
for  
Which Patient ?*

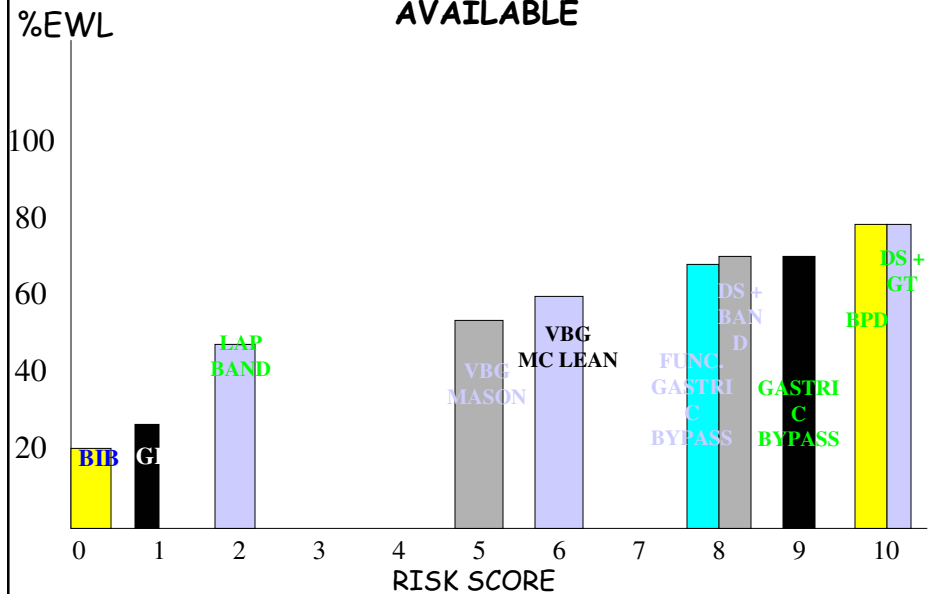
**EFFECTIVENESS (% EWL) OF THE VARIOUS SURGICAL  
TECHNIQUES CURRENTLY AVAILABLE**

OPERATION	% EWL
Intragastric Balloon (BIB)	20
Gastric Pacing	25
Lap-Band	50
Vertical Banded Gastroplasty (Mason)	55
Vertical Banded Gastroplasty (Mc Lean)	60
“Functional” Gastric By-pass	70
Duodenal switch + Lap-Band (Band inaro)	75
Gastric By-pass	75
Bilio Pancreatic Diversion	80
Duodenal Switch + Gastric Tubulisation	80

### RISK SCORE OF THE VARIOUS SURGICAL TECHNIQUES CURRENTLY AVAILABLE

OPERATION	General Anesthesia	Invasiveness Opening G.I. Tract	Anatomical Reversibility	Functional Reversibility	Morb	Risk Score
Intragastric Balloon (BIB)	0	0	0	-	0	0
Gastric Pacing	1	0	0	-	0	1
Lap-Band	1	0	0	-	1	2
Vertical Banded Gastroplasty (Mason)	1	1	-	1	2	5
Vertical Banded Gastroplasty (Mc Lean)	1	2	-	1	2	6
“Functional” Gastric By-pass	1	3	-	1	3	8
Duodenal Switch + Lap Band (Band inaro)	1	3	-	1	3	8
Gastric By pass	1	3	-	1	4	9
Bilio Pancreatic Diversion	1	4	-	1	4	10
Duodenal switch + Gastric Tubulisation	1	4	-	1	4	10

### EFFECTIVENESS (%EWL) AND RISK SCORE OF THE VARIOUS SURGICAL TECHNIQUES CURRENTLY AVAILABLE



*Kral John G*

*“...staged operation might be the solution to the problem of selecting and appropriate bariatric operation since it was not possible to predict which patients would be well served by pure gastric restrictive operation and which patients would need the addition of malabsorption...”*

*National Institute of Health (NIH)  
Consensus Development Conference on Gastrointestinal Surgery for Severe Obesity  
1991*

*Inter-disciplinary European Guidelines  
on Surgery of Severe Obesity  
(IFSO-EC, EASO, IOTF, ECOG)*

*Assigning a patient to a particular bariatric procedure:*

*“At this moment, there are insufficient evidence-based data to suggest how to assign a patient to any particular bariatric procedure”.*

*Int J Obesity 2007;31:569-77*

**Weight Loss and Risk Score in Lap Band (LAGB), Vertical Banded Gastroplasty (VBG) and Roux-en-Y Gastric Bypass (RYGB):**

**A Systematic Literature Review.**

(64 studies LAGB; 57 studies comparative procedure)

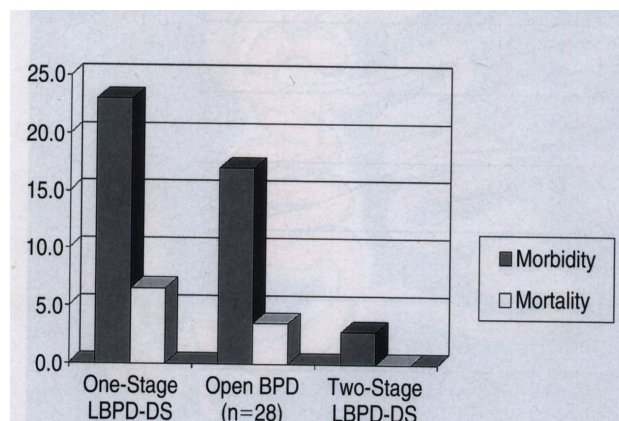
	N. of patients	Mortality rate	Morbidity rate	% Excess Weight Loss	
				0-2 years	2-4 years
<b>LAGB</b>	5780	0.05%	11.3%	↑ ↑	↑ ↑
<b>VBG</b>	2858	0.31%	25.7%	↑ ↑ ↑	↑ ↑
<b>RYGB</b>	9258	0.50%	23.6%	↑ ↑ ↑	↑ ↑

**Chapman AE**

*Laparoscopic Adjustable Gastric Banding in the Treatment of Obesity:  
A Systematic Literature Review  
Surgery 135; 326-351, 2004*

**Gagner Series**

Morbidity and mortality percentages according to open BPD-DS, Laparoscopic BPD-DS, and Two Stage Laparoscopic BPD-DS



Gagner M, Inabnet W B, Pomp A

*Laparoscopic Sleeve Gastrectomy with Second Stage Biliopancreatic Diversion and Duodenal Switch in the Super Obese*

*Laparoscopic Bariatric Surgery. Lippincot Williams & Wilkins 2004*

## *Sequential Treatment of Obesity*

*Improvement of Results:*

↓ *“Overtreatment”*

↓ *Morbidity*

↓ *Mortality*

*Quality of life*  
+  
*Risk/benefit*  
=  
*step by step approach*  
*or*  
*sequential treatment of obesity*

***Laparoscopic Gastric Banding for 1800 Patients: 12 Years Results***

**LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING IN 1791  
CONSECUTIVE OBESE PATIENTS: 12-YEARS RESULTS**

***F Favretti, G Segato, D Ashton, L Busetto, M De Luca, M Mazza, A Ceoloni, O  
Banzato, E Calo, G Enzi.***

***Obesity Surgery, 17, 168-175, 2007***

***Laparoscopic Gastric Banding for 1800 Patients:  
12 Years Results***

***Our Series***

***(Septembre 1993/ December 2005)***

***1791 Patients***

***(F/M 1345/446)***



***Laparoscopic Gastric Banding for 1800 Patients:  
12 Years Results***

***1791 Patients***

***Follow up Rate (12 Years): 91.6 %***

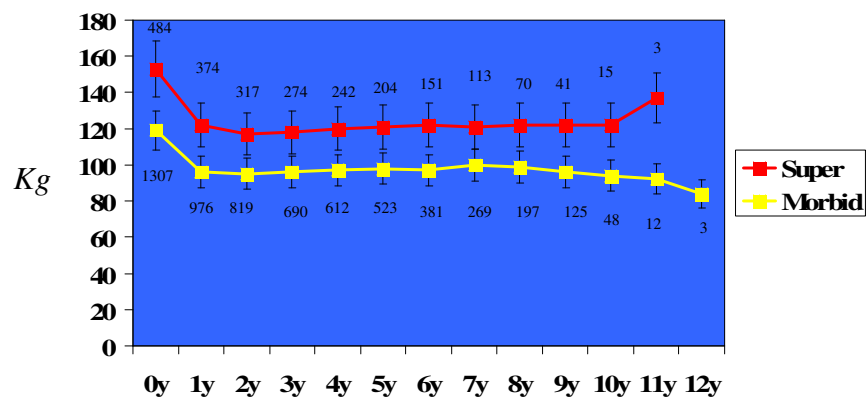
***Laparoscopic Gastric Banding for 1800 Patients:  
12 Years Results***

***1791 Patients***

***Mortality 0***

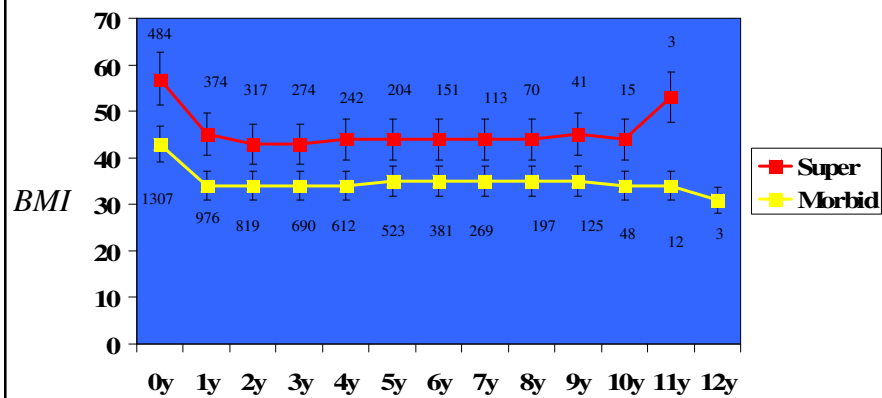
*Laparoscopic Gastric Banding for 1800 Patients: 12 Years Results*

*Results in Super e Morbid Obese (BMI)*



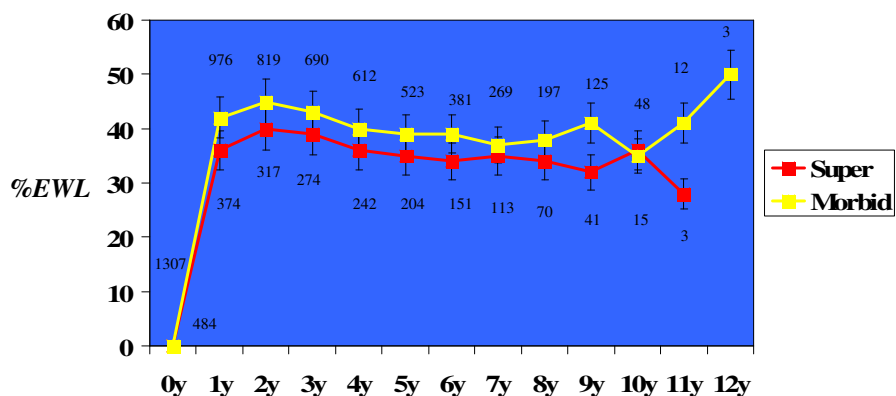
*Laparoscopic Gastric Banding for 1800 Patients: 12 Years Results*

*Results in Super e Morbid Obese (BMI)*



**Laparoscopic Gastric Banding for 1800 Patients: 12 Years Results**

**Results in Super e Morbid Obese (% EWL)**

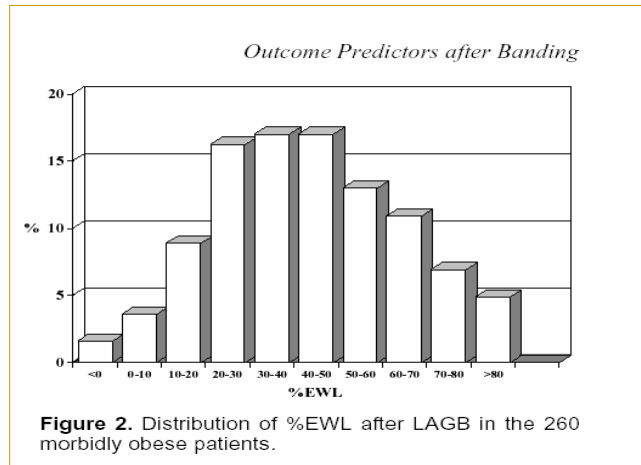


**Laparoscopic Gastric Banding for 1800 Patients: 12 Years Results**

**Major Complications Requiring Reoperation (106/1791 pts.; Sept 1993-Dec 2005)**

Complications	Number	Rate of Complications	Reoperation	Number	Rate of Reoperation
Stomach Slippage + Pouch Dilatation	70	3.9%	• Removal • Repositioning	20 50	1.1% 2.8%
Erosion	16	0.9%	Removal	16	0.9%
Psychological Intolerance	14	0.7%	Removal	14	0.7%
Miscellaneous (HIV, Infections, Microperforation)	5	0.27%	Removal	5	0.27%
Gastric Necrosis	1	0.05%	Gastrectomy	1	0.05%
<b>Total</b>	<b>106</b>	<b>5.9%</b>	<b>Total</b>	<b>106</b>	<b>5.9%</b>
Unsatisfactory Results (Lack of Compliance)	41	2.3%	• BPD • Removal • "BandInaro"	5 12 24	0.27% 0.7% 1.3%

## ***Lap-Band Patients: No Responders***



... about “no responders”....

## *No Responders*

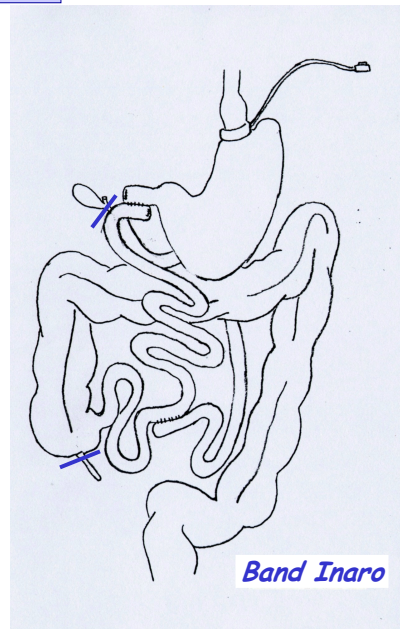
- *Gastric Bypass and Functional Gastric Bypass*
- *Vertical Banded gastroplasty*
- *Scopinaro*
- *Sleeve Gastrectomy and/or Duodenal Switch*

### *Vicenza Series*

**Lap Band + Scopinaro**

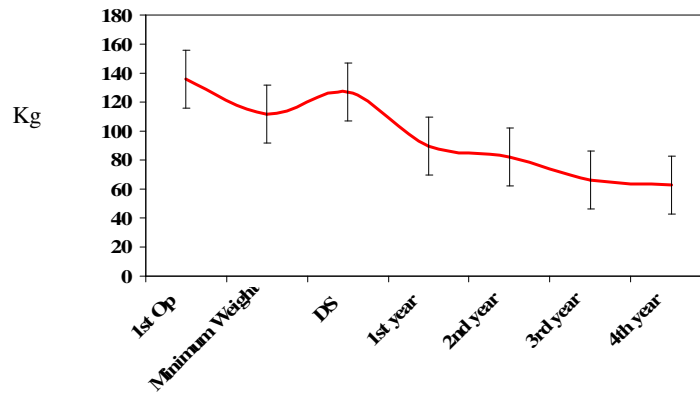
**Band-Inaro**

- Digestive loop = 200 cm.
- Common loop = 50 cm
- Bilio-pancreatic loop = remainder of small intestine



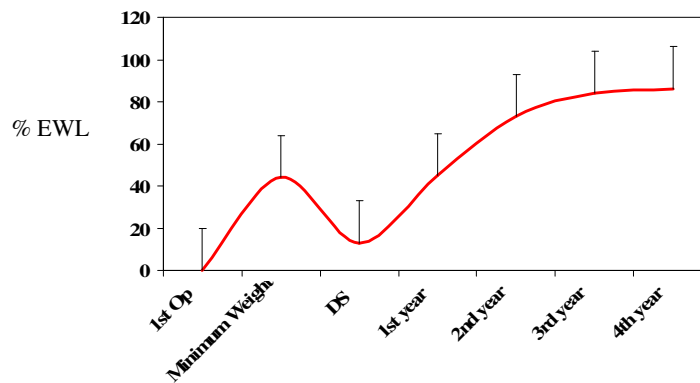
*Vicenza Obesity Center  
Laparoscopic Bandinaro*

*Mean Weight Loss (Kg) in a subset of 84 pts (laparoscopic series) with a follow-up more than 12 months. March 2001/January 2007*



*Vicenza Obesity Center  
Laparoscopic Bandinaro*

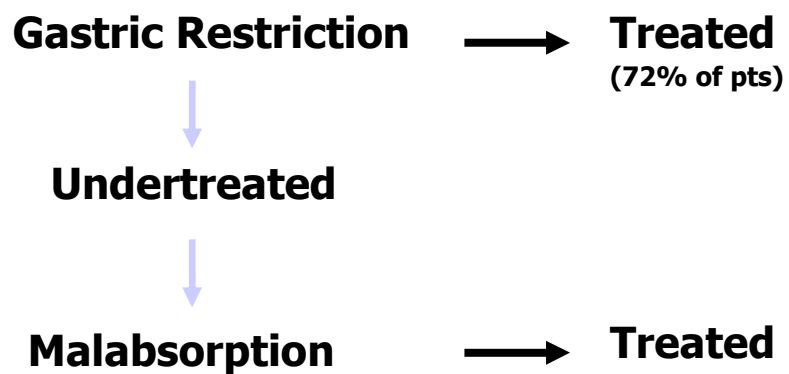
*Mean Weight Loss (%EWL) in a subset of 84 pts (laparoscopic series) with a follow-up more than 12 months. March 2001/January 2007*

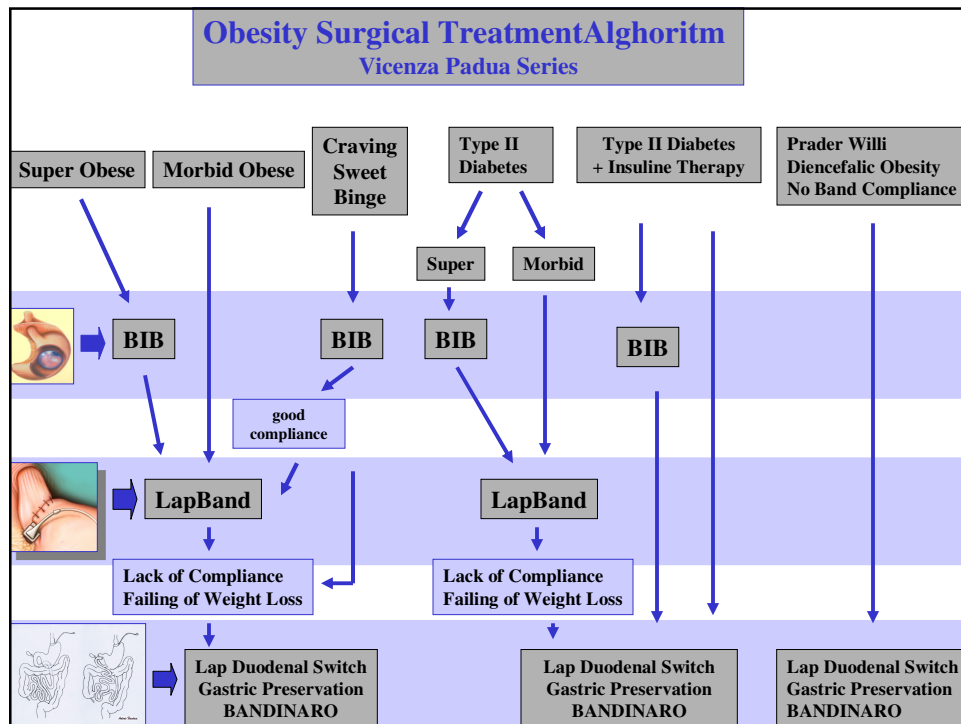




## *Sequential Treatment*

### **BARIATRIC SURGERY Sequential Treatment**





*Why LapBand and not Gastric Bypass as first choice?*



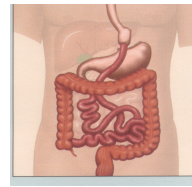
- Lap Band → 55% EWL
- RYGB → 59% EWL

Published series with initial recruitment of at least 50 patients with follow-up of 3 years and more. 8 LapBand Studies and 7 RYGB studies

**LapBand Studies:** Favretti 2000, Belachew 2002, O'Brien 2002, Vertruyen 2002, Dargent 1999, Zinzindohoue 2003, Rubenstein 2002

**RYGB Studies:** Pories 1995, Freeman 1997, Jones 2000, Schauer 2000, Rutledge 2001, Smith 1996, Capella 1996, Fox 1996

## ***LapBand vs ByPass Surgery***



## **Procedure**

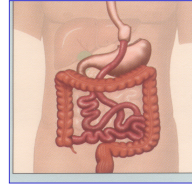
### ***LapBand***

*Restrictive adjustable procedure  
Over 300.000 placed worldwide  
Nearly 100% laparoscopic  
procedure*

### ***Roux-en-Y Gastric Bypass***

*Restrictive and malabsorptive  
procedure  
Over 80.000 annually in U.S.  
Nearly 42% laparoscopic  
procedure*

## ***LapBand vs ByPass Surgery***



### **Pros**

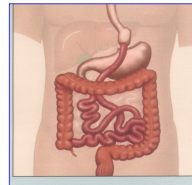
#### ***LapBand***

*Lowest mortality rate  
Least invasive surgery  
Lowest surgical complication rate  
No stomach or small bowel  
stapling or cutting  
Fully Reversible  
Low Malnutrition risk*

#### ***Roux-en-Y Gastric Bypass***

*Rapid initial WL  
Better than LapBand  
Minimally invasive approach is  
possible*

## ***LapBand vs ByPass Surgery***



### **Cons**

#### ***LapBand***

*Slower initial WL  
Mandatory regular follow-up  
Requires an implanted medical  
device*

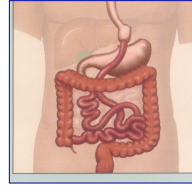
#### ***Roux-en-Y Gastric Bypass***

*Permanent change in anatomy  
Cutting and stapling of stomach  
and bowel  
Non reversible, non adjustable  
Higher mortality rate  
Weight Regain: 24-55% at 5 years  
Reduced absorption of Iron, Vit  
B12, Folic Acid, and Calcium  
Dumping Syndrome is possible*

## LapBand vs ByPass Surgery



### Complications



### LapBand

*Perioperative complications:* less than 1%

*Slippage:* up to 10%

*Erosion:* up to 1.9%

*Mortality Rate:* up to 0.05% (1:2000)

### Roux-en-Y Gastric Bypass

#### *Perioperative complications*

1. PE: up to 3.4%
2. Anastomosis leak: up to 5.6%
3. Anastomosis stricture: up to 10%

#### *Post-op late complications*

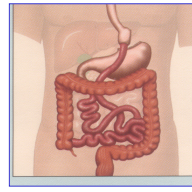
1. Hernia: up to 24%
2. Marginal ulcer: up to 10%
3. Bowel obstruction: up to 3%
4. Re-do: up to 30%
5. Wound infection: up to 8.3%

***Mortality Rate: up to 1% (1:100)***

## LapBand vs ByPass Surgery



### References



1. Robert E. Brolin, Survey of Vitamin and Mineral Supplementation after Roux-en-Y Gastric Bypass and after Biliopancreatic Diversion for Morbid Obesity. *Obesity Surgery*, 1999.
2. G. Skroubis, Comparison of Nutritional Deficiencies after Roux-en-Y Gastric Bypass and after Biliopancreatic diversion with Roux-en-Y Gastric Bypass. *Obesity Surgery*, 2002.
3. Barry L. Fisher M.D., Philip Schauer, M.D., Medical and Surgical Options in the Treatment of Severe Obesity. *American Journal of Surgery* 2002; 184: 9S-16S.
4. Executive summary: Laparoscopic Adjustable Gastric Banding for the Treatment of Obesity (Update and Re-appraisal). *The Australian Safety and Efficacy Register of New Interventional Procedures – Surgical* (ASERNIPS) 2002: 1. (Laparoscopic adjustable gastric banding surgery, like the LAP-BAND surgery, is associated with a mean short-term mortality rate of around 0.05% compared to 0.50% for Gastric Bypass and 0.31% for Vertical Banded Gastroplasty).
5. Harvey J. Sugarman, M.D., Bariatric Surgery for Severe Obesity. *Journal of the Association for Academic Minority Physicians*, 2001; 12.

## Early Mortality Among Medicare Beneficiaries Undergoing Bariatric Surgical Procedure

**DR Flum, L Salem, JAB Elrod,  
EP Dellinger, A Cheadle, L Chan**

**Jama, 2005; 294: 1903-1908**

*Thyrtly-day, 90-day and 1-year postsurgical all-cause mortality among **16155** patients undergoing bariatric procedures*

*81.2% of pts underwent to RYGBP*

*18.8% of pts underwent to other surgery (VBG or revisional surgery)*

## Early Mortality Among Medicare Beneficiaries Undergoing Bariatric Surgical Procedure

**DR Flum, L Salem, JAB Elrod, EP Dellinger, A Cheadle, L Chan**

**Jama, 2005; 294: 1903-1908**

### Mortality Rate After Bariatric Surgery, by Age and Sex

Age Category (y) and Sex	No.	Mortality Rate, %		
		30 Days	90 Days	1 Year
<25				
Women	150	0.7	1.3	2.0
Men	53	0.0	1.9	1.9
Subtotal	203	0.7	1.5	2.0
25-34				
Women	1341	0.8	1.3	2.5
Men	466	2.1	3.3	4.3
Subtotal	1827	1.1	1.8	3.0
35-44				
Women	3288	1.0	1.5	2.7
Men	1121	3.2	3.7	5.6
Subtotal	4409	1.5	2.0	3.4
45-54				
Women	4214	1.1	1.8	3.1
Men	1191	4.5	5.4	7.7
Subtotal	5405	1.9	2.6	4.1
55-64				
Women	2126	2.0	2.5	4.7
Men	668	2.1	3.1	6.9
Subtotal	2794	2.0	2.7	5.2
65-74				
Women	1039	2.6	3.4	6.2
Men	342	5.8	8.2	12.9
Subtotal	1381	3.4	4.6	7.8
≥75				
Women	85	18.8	28.2	40.0
Men	51	19.6	35.3	51.0
Subtotal	136	19.1	30.9	44.1
Total	16155	2.0	2.8	4.6

**Table 3.** Odds of Death at 90 Days Based on Patient Characteristics



## *Bariatric Surgery*

*Future characterized by:*

- *Major impact of Quality of Life and Risk/Benefits Analyses Concepts*
- *Step by Step approach/Sequential Therapy of Obesity*

## *Conclusions*

- *Surgery is considered the best choice in Patients with BMI >35 and comorbidities in terms of weight loss stable in time*
- *LAP-BAND is safe and effective in the short, medium and long term*
- *Weight loss is stable over 12 years*
- *In experienced hands the complication rate is low*
- *No Responders LAP BAND Individuals can be treated with GBP, VBG, SG and/or DS, Scopinaro, Bandinaro, Functional GBP*