



County Council
of Östergötland

Linköping University
FACULTY OF HEALTH SCIENCES

***Skräddarsydd kirurgisk
behandling vid viktrecidiv***

Mikael Wirén
Biträdande professor, IKE
Överläkare Kirurgkliniken Vrinnevi

**10-20% of operated patients
will experience significant
weight regain**

Sjöström CD et al. SOS-study. *Obes Res* 1999;477-84

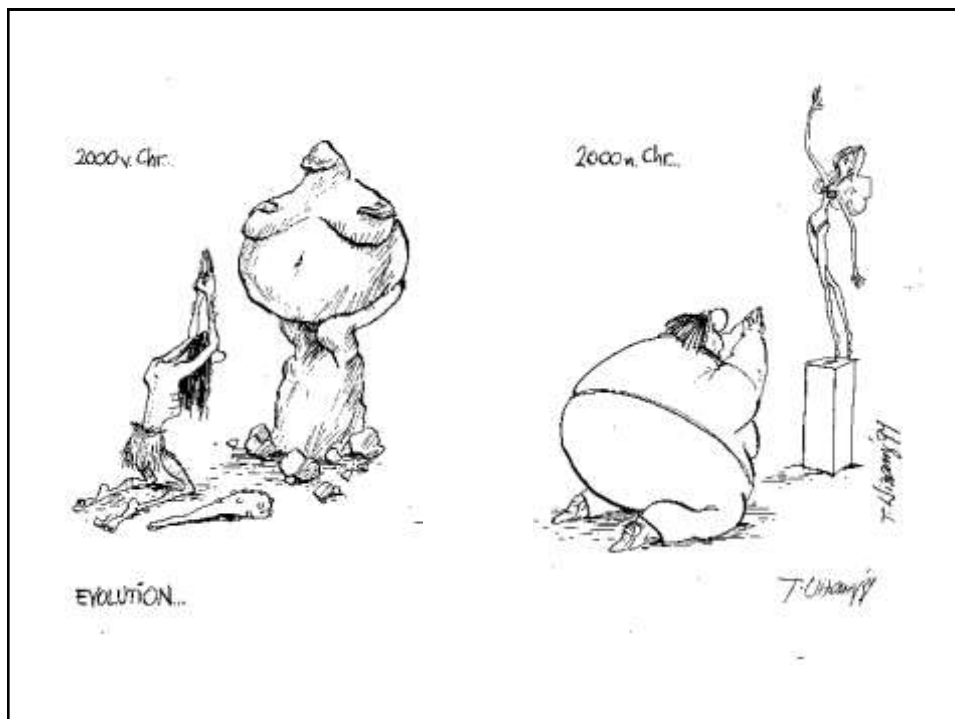
Agenda

- Background – physiology
- Surgical options
- What does the literature tell us?
- Case description
- Suggestions

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2



STUDENT CONSULT

The diagram illustrates the gut-brain axis. It shows a human silhouette with internal organs and the brain. The hypothalamus in the brain is connected to the vagus nerve, which runs down to the stomach. Various hormones are shown: Leptin from the adipose tissue, Ghrelin from the stomach, Insulin from the pancreas, and CCK from the small intestine. The large intestine and small intestine are also labeled. The diagram is titled 'STUDENT CONSULT' and includes a copyright notice for Elsevier, Guyton & Hall: Textbook of Medical Physiology 11e - www.studentconsult.com.

Hypothalamus
Vagus nerve
Stomach
Leptin
Ghrelin
Insulin
CCK
PYY
Large intestine
Small intestine

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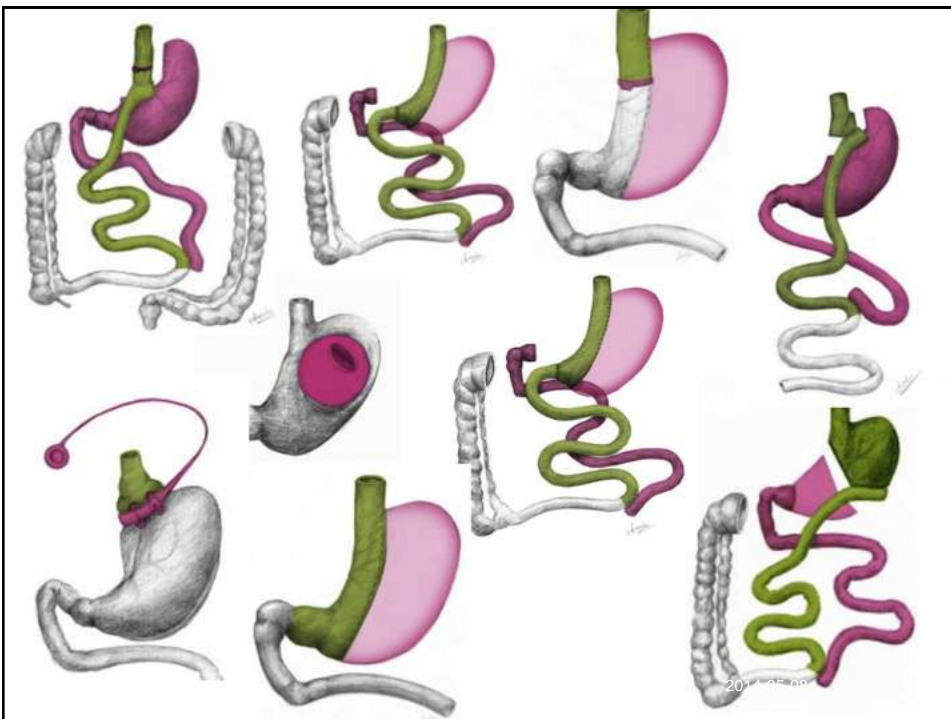
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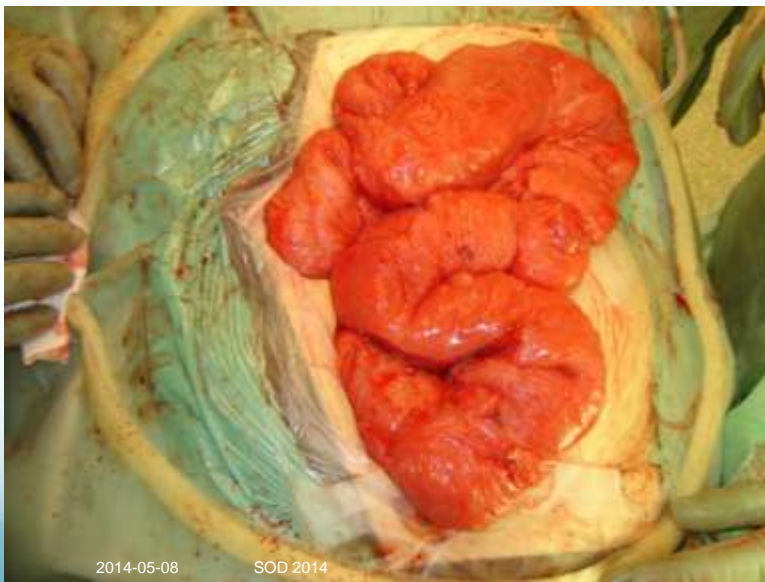


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6

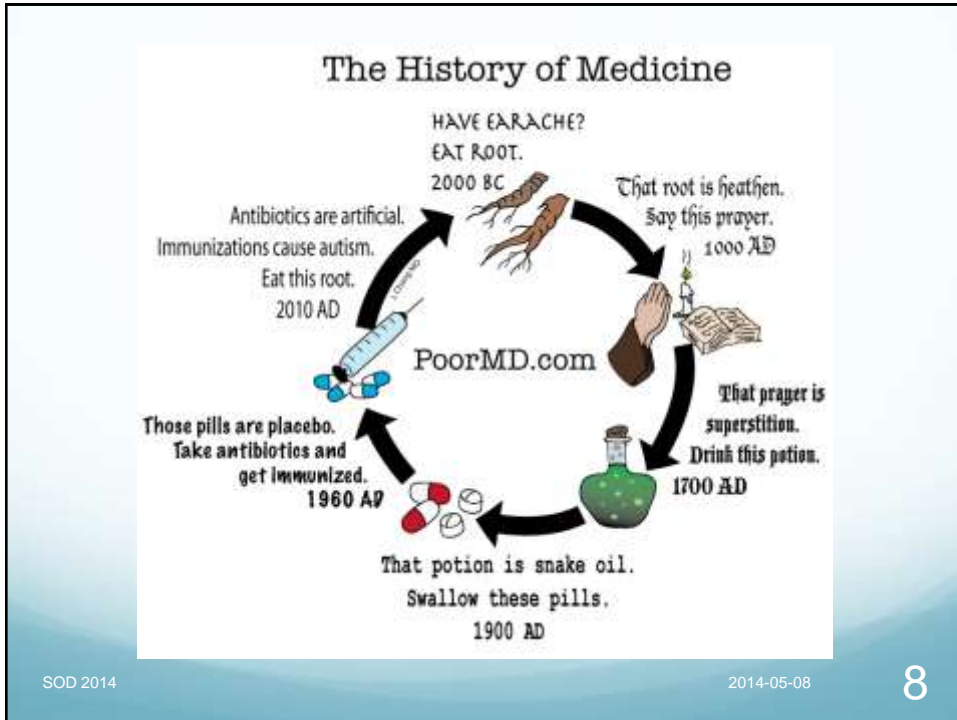
Worst case scenario



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7



Disclosures

Lecturer/author

Ethicon Endo Surgery Bariatric and Metabolic

Fresenius Kabi

Nestlé

Astra Zeneca

Advisory consultant

Taizhou Hospital, Linhai, PRC

Internetmedicin

Bariatrics

Nutrition

Causes of obesity

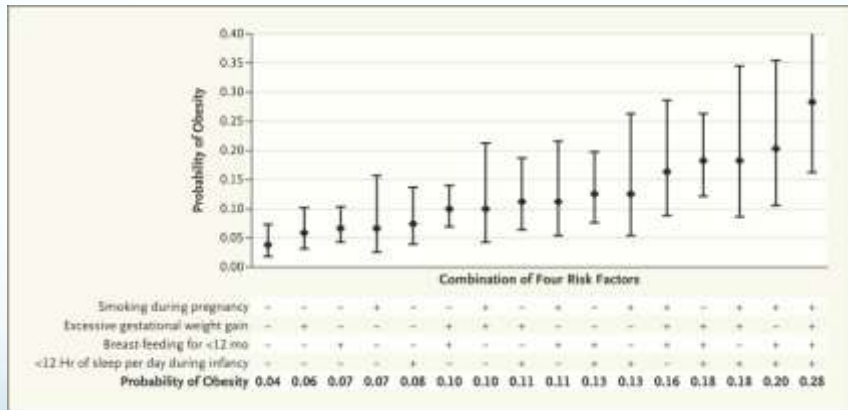
- Genetics
- Intrauterine/neonatal programming
- Hormonal factors
- Trauma/diseases/drugs affecting hypothalamus and regulating pathways
- Psychosocial factors; food, stress, sleep ...
- Neuropsychiatry; ADHD

Other causes

What about food, preservatives, pesticides, antibiotica, viruses and microbiota?

Prevention or treatment? The Effect of the Combination of Four Risk Factors

Prevention or treatment?



Gillman MW, Ludwig DS. N Engl J Med 2013. DOI: 10.1056/NEJMp1310577

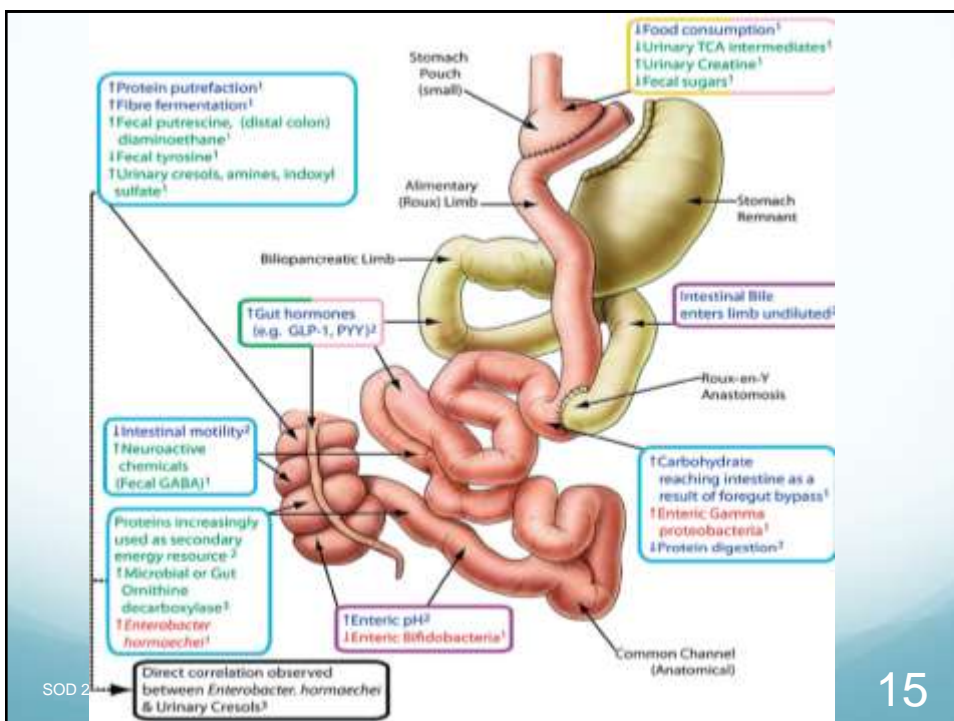
THE NEW ENGLAND
JOURNAL of MEDICINE

Bariatric surgery - physiology

How does actually gastric bypass work?

COLOR CODE KEY FOR BRAVE EFFECTS (Box outline)		LABEL KEY	TEXT COLOR KEY
	B-Bile Flow alteration	1. Direct observation	Physiology
	R-Reduction of gastric size	2. Literature	Biochemistry
	A-Anatomical gut rearrangement and altered flow of nutrients	3. Hypothesis	Microbiology
	V-Vagal manipulation		
	E-Enteric gut hormone modulation		

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Mechanisms at work after bariatric surgery

- Vagal nerve stimulation
- Physiologic alterations in GI-peptide release
- Microbiota
- Biliopancreatic flow
- Reduction in caloric intake
 - Satiety
 - Loss of appetite/change in taste preferences
- Positive feed-back from weight reduction with changes in dietary intake and lifestyle
 - Increase in physical activity

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16

Malabsorptive procedures



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

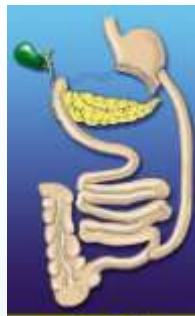


FIGURE 4
BILIOPANCREATIC
DIVERSION (BPD)
(SCOPNARO)



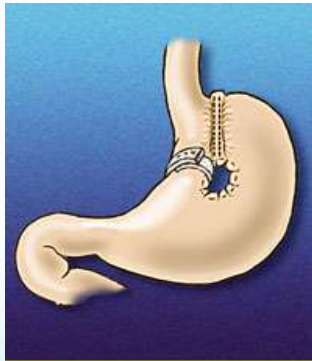
FIGURE 5
BILIOPANCREATIC
DIVERSION (BPD) WITH
DUODENAL SWITCH
(HESS/MARCEAU)

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17

VBG - the Gold Standard



**FIGURE 13
VERTICAL BANDED
GASTROPLASTY
(MASON)**

One size fits all?

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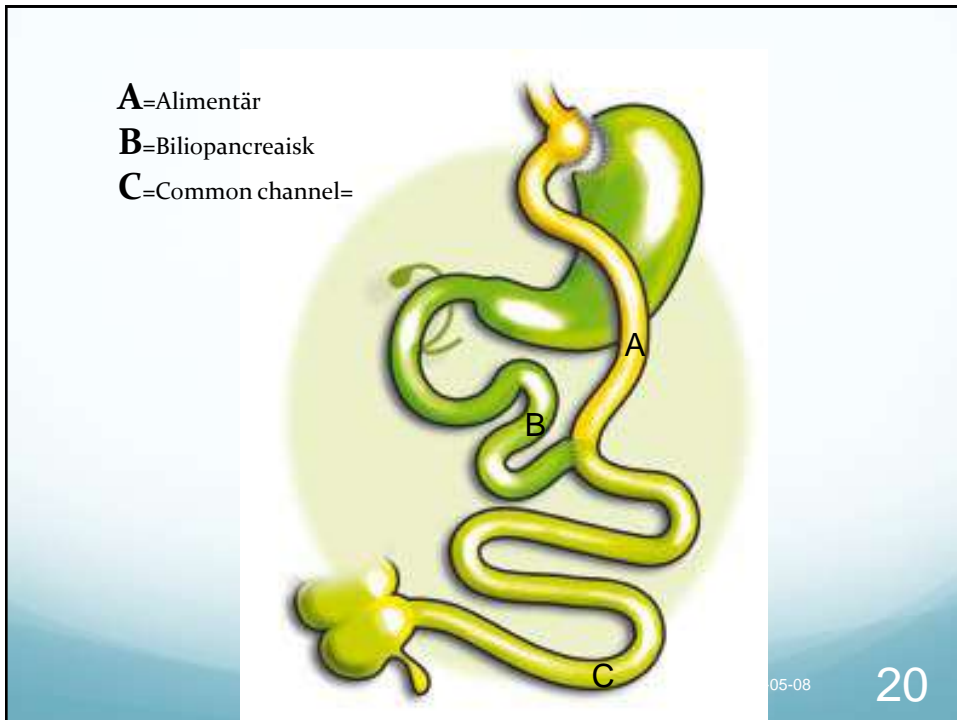
18



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19



What do we mean by saying; "Surgery did not give the expected result"?

- "Insufficient" weight loss
- Weight regain
- No regress or progress of co-morbid disease state
- Complications
- Side effects
- Need of revisional surgery
- The procedure did not meet expectations
- Patient regrets doing the procedure

How can we reduce the number of patients where bariatric surgery did not give the expected result

- Are patient expectations realistic?
- Preoperative information
- Preoperative optimization
- Tailored surgery

Buchwald H Obes Surg 2002 "A bariatric surgery algorithm"

- Postoperative follow-up
- Systematic search for patients with problems
- Postoperative support groups

Is surgical thinking a smart concept?

- The idea that a chronic medical condition always will be cured by one treatment option using one time point of intervention is not common in medicine!
- In most other chronic conditions (malignant and benign) there are first, second and third line treatments.
- The idea that only one method is the only one to offer to all patients is probably not a way for development of surgery.

Is surgical thinking a smart concept?

- The idea that a chronic medical condition always will be cured by **one** treatment option using **one time** point of intervention is not common in medicine!
- In most other chronic conditions (malignant and benign) there are first, second and **third line** treatments.
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Weight regain - Causes

- Adaptation of the GI-tract
- Eating disorders
- Alcohol/Liver disease
- Depression/Medication
- Lack of knowledge/understanding
- Lack of motivation to change lifestyle

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Definitions

- Re-operation
- Revision
 - Conversion VBG - GBP
 - Correction GPB - GBP
 - Restitution to normal

Surgical options, primary procedures

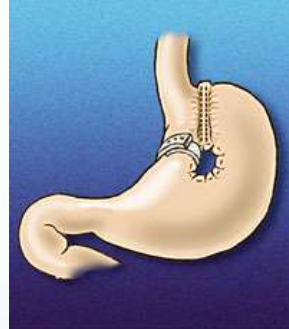
- Adjustable gastric banding
- Vertical gastric banding
- Biliopancreatic diversion
- Duodenal switch
- Gastric bypass
- Sleeve

After restrictive procedures

Adjustable gastric banding
Vertical gastric banding

- Suggestion
 - Gastric bypass

- Alternative
 - Add malabsorptive component



**FIGURE 13
VERTICAL BANDED
GASTROPLASTY
(MASON)**

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After Biliopancreatic diversion

- Suggestion
 - Shorten the common limb

- Alternative
 - Gastric bypass (long limb)



**FIGURE 4
BILIO-PANCREATIC
DIVERSION (BPD)
(SCOPINARO)**

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After Duodenal switch

- Suggestion
 - Shorten the common limb
 - Add restriction (Fobi ring)
 - Resize the gastric sleeve
- Alternative
 - Gastric bypass (long limb)



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30

After Gastric bypass

- Suggestion
 - Convert to long limb GBP
 - Add restriction (Fobi ring)
- Alternatives
 - Duodenal switch
 - Biliopancreatic diversion



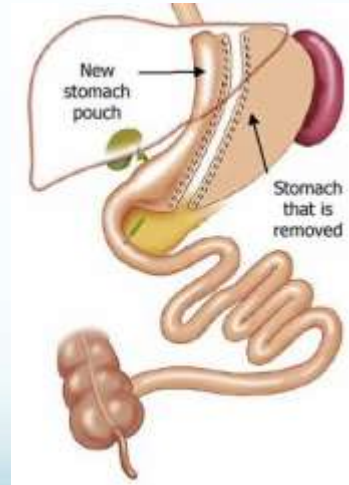
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After Sleeve

- Suggestion
 - Gastric bypass
 - Duodenal switch
- Alternative
 - Add restriction (Fobi ring)



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32



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33

Revision Surgery for Treatment of Weight Regain After Roux-En-Y Gastric Bypass

Ferraz A et al Obesity Surg 2014: 2-8

- 29 patients
- Weight regain 5 years after gastric bypass
- Post-op follow up 13,7 months
- A. Increase of alimentary limb to 200 cm (n=9)
- B. A + silicon ring (n=13)
- C. A + plication (n=2)
- D. Plication + silicon ring (n=5)

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34

Revision Surgery for Treatment of Weight Regain After Roux-En-Y Gastric Bypass

Ferraz A et al Obesity Surg 2014: 2-8

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35

Revision Surgery for Treatment of Weight Regain After Roux-En-Y Gastric Bypass

Ferraz A et al Obesity Surg 2014: 2-8

- A. Increase of alimentary limb to 200 cm (n=9)
 - BW loss 14,6 % (21 months)
- B. A + silicon ring (n=13)
 - BW loss 23,1 % (11 months)
- Pat's with a ring lost 20% (n=19, FU 9 mths)
- Pat's without a ring lost 11 % (n=10, FU 13 mths)

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Weight recidivism post-bariatric surgery – a systematic review

Patient related factors

- Dietary non-compliance
- Eating disorders
- Physical inactivity
- Hormonal/metabolic
 - Ghrelin
 - Glucose homeostasis

Surgery-related factors

- AGB
 - Pouch dilatation
- GBP
 - Stoma dilatation?
 - Pouch dilatation?
 - Gastro-gastric fistula
- Sleeve
 - Sleeve dilatation

Karmali S et al. Obes Surg 2013:1922-1933

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37

4 non-randomized controlled studies

Sjöström L N Engl J Med (SOS-study) 2004

Bond DS Int J Obes 2009

Roslin M Surg Endosc. 2011

Rutledge T Obes Surg 2011

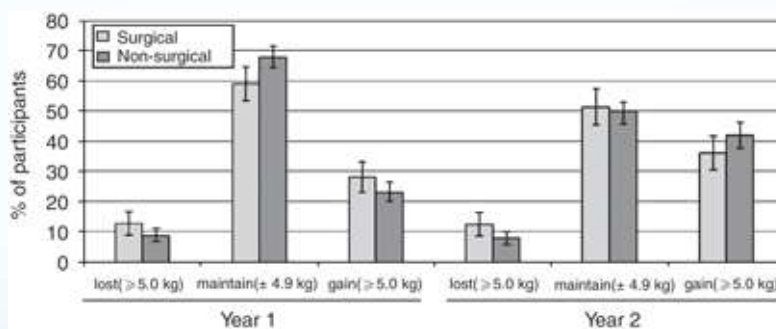
Karmali et al. Obes Surg 2013

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38

105 operated vs 210 non-operated weight losers



Distribution of levels of weight maintenance at 1- and 2-year follow-up assessments by method of initial weight loss.

SOD 2014

Bond DS Int J Obes 2009

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39

Surgical participants reported less physical activity, more fast food and fat consumption, less dietary restraint, and higher depression and stress at entry and 1 year.

Higher levels of disinhibition at entry and increased disinhibition over 1 year were related to weight regain in both groups.

Bond DS

Weight loss maintenance in successful weight losers; surgical vs non-surgical methods.

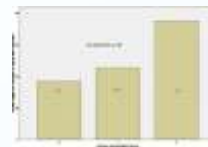
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Nearly three fourths of the sample (N=60) carried either a single (40.0%) or multiple psychiatric diagnoses (33.4%). Nearly half (47.5%) of the sample ceased losing weight after 1 year, with 29.5% regaining weight after this point.

Patients with two or more psychiatric diagnoses were found to be significantly more likely to experience weight loss cessation or weight regain after 1-year (OR= 6.4, 95% CI = 1.3–12.4)



Rutledge T

Psychiatric factors and weight loss patterns following gastric bypass surgery in a veteran population.

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41

Thirty-six patients who were at least 6 months postoperative from RYGB were administered a 4-h GTT with measurement of insulin levels.

Mean age was 49.4 ± 11.4 years, mean preoperative body mass index (BMI) was 48.8 ± 6.6 kg/m², percent excess BMI lost (%EBL) was $62.6 \pm 21.6\%$, mean weight change from nadir weight was 8.2 ± 8.6 kg mean follow-up time was 40.5 ± 26.7 months. Twelve patients had diabetes preoperatively.

Roslin M

Abnormal glucose tolerance testing following gastric bypass demonstrates reactive hypoglycemia

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42

Thirty-two of 36 patients (89%) had abnormal GTT. Six patients (17%) were identified as diabetic based on GTT. All six of these patients were diabetic preoperatively.

Twenty-six patients (72%) had evidence of reactive hypoglycemia at 2 h post glucose load. Within this cohort of 26 patients, 14 had maximum to minimum glucose ratio (MMGR) $>3:1$, 5 with a ratio $>4:1$.

Eleven patients had weight regain greater than 10% of initial weight loss (range 4.9-25.6 kg). Ten of these 11 patients (91%) with weight recidivism showed reactive hypoglycemia.

Roslin M

Abnormal glucose tolerance testing following gastric bypass demonstrates reactive hypoglycemia

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43

Hormonal imbalance

- High ghrelin/low PPY – weight regain?
- Postprandial suppression of ghrelin correlates to weight loss in RYGBP and Sleeve resection
 - Engström BE et al Int J Obes 2007: 476-480
 - Bohdjalan A et al. Obes Surg 2010: 535-540
- Elevation in ghrelin post-op associated with weight regain
 - Margo DO Obes Surg 2008: 648-651
- An anti-ghrelin vaccine?
 - Monteiro M, unpublished data

Case 1

- Female, born 1971
- AGB 1994 BW 135 kg, reoperated 1995
- Initial rapid weight loss
- GBP 1998, leakage and reop
- 2001 weight regain
- Can eat normal portions solid food
- **Please – reoperate!**

Revision surgery

- Evaluation to rule out anatomical/behavioural problems
- Biliopancreatic diversion with a duodenal switch (open surgery)
- Good weight loss
- Increasing postprandial abdominal pain
- Exploratory laparotomy x 2

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46

Worst cases...

- Chronic abdominal pain
 - Opioid dependency
- Malnutrition
 - PN support needed
- Osteoporosis
 - Pathological fractures

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47

Collaboration!

- Gastroenterologist
- "Pain expert"
- Psychiatrist
- GP
- Home care team
- Endocrinologist (osteoporosis)

Mandatory before surgical consideration

- Multidisciplinary evaluation
 - Dietary
 - Psychiatric
 - Nurse or physiotherapeut
 - Endocrinologist
- Radiology
 - Anatomy
 - Other diseases (liver)
- Endoscopy

No one objects to being too thin or too rich.

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Summary surgical options

- Restrictive procedures
- Biliopancreatic diversion
- Duodenal switch
- Gastric bypass
- Sleeve
- Gastric bypass
- Add restriction
- Increase malabsorption
- Add restriction/limbs...
- GBP or DS

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51



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expanding reality

Thank You!

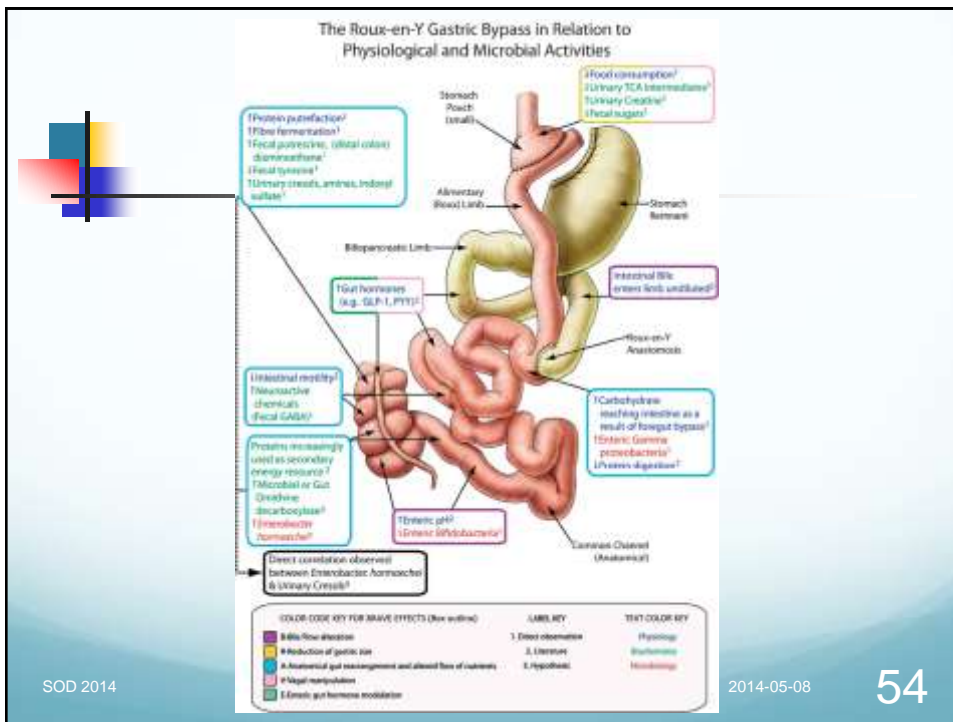
mikael.wiren@liu.se

www.liu.se

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Bibehållande av lägre vikt.

- Efter att personer med fetma har gått ner i vikt kan de behålla sin vikt bättre med råd om lågfettkost med lågt glykemiskt index och/eller högt proteininnehåll än med lågfettkost med högt glykemiskt index och/eller lågt proteininnehåll.
- Det saknas underlag för att bedöma om även råd om t ex lågkolhydratkost och medelhavskost är effektiva för att förebygga viktuppgång efter viktninskning.





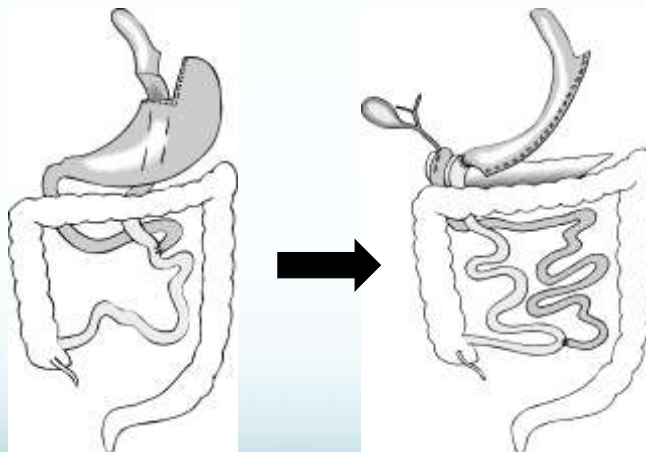
**AKADEMISKA
SJUKHUSET**

Surgical options in failed GBP

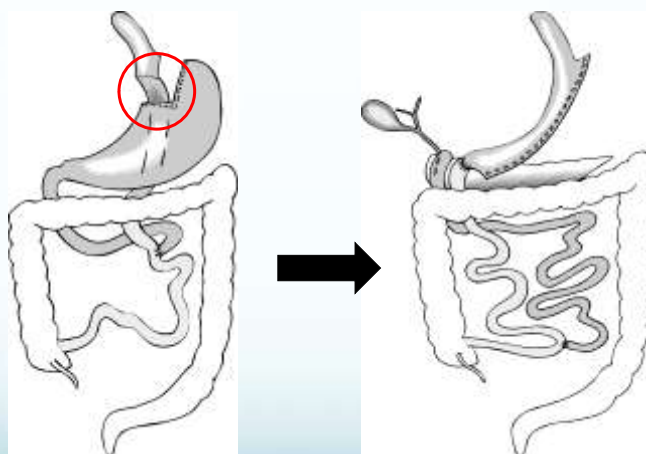
Magnus Sundbom
2nd Nordic Bariatric Meeting, 2014

UPPSALA UNIVERSITY HOSPITAL

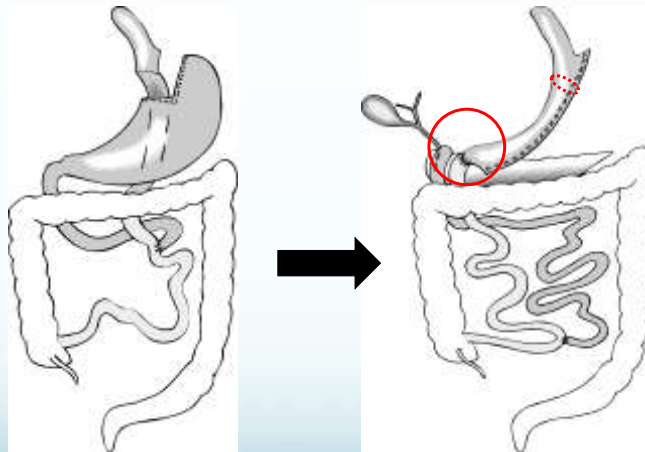
Convert GBP to DS



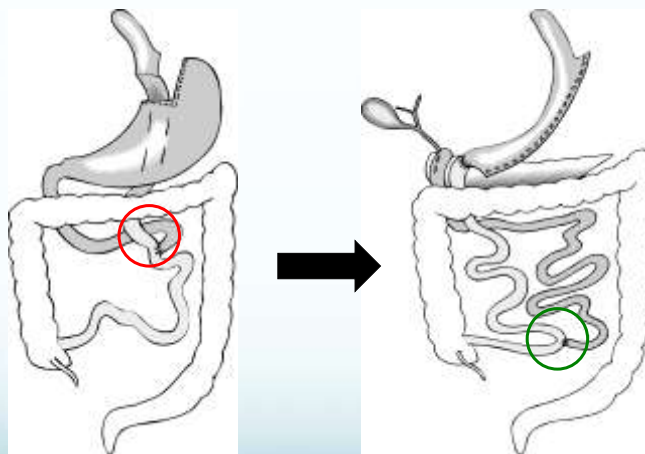
Convert GBP to DS

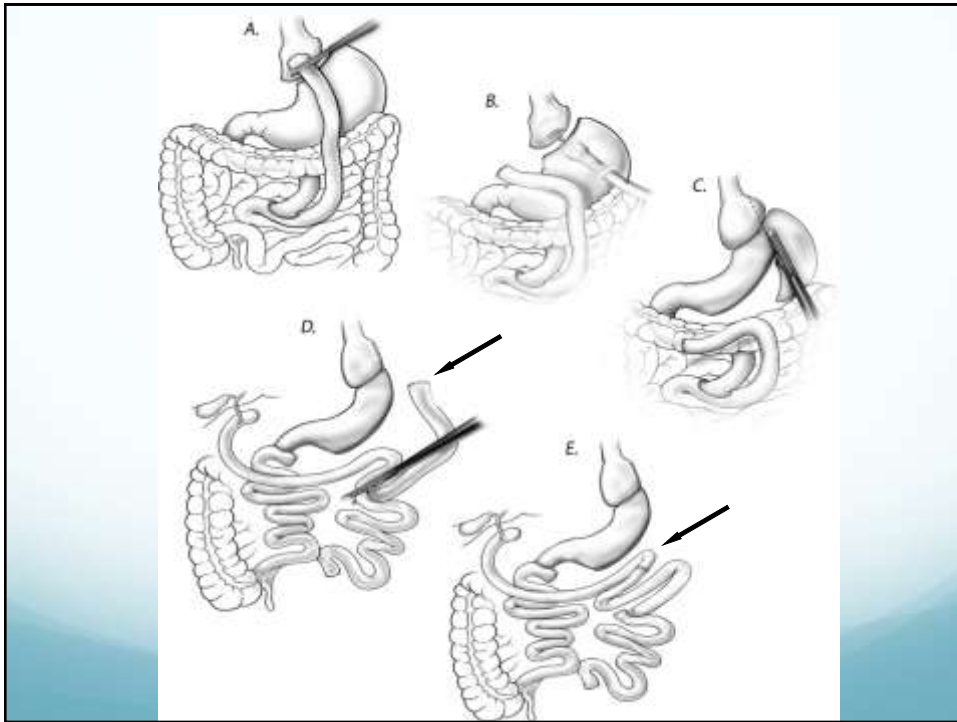


Convert GBP to DS



Convert GBP to DS





Parikh et al, NY, USA

- 12 patients, laparoscopic conversion
 - BMI 41
 - 4 revisional GBP-surgery
- Perioperative data
 - Gastro-gastrostomy 25-mm circular stapler
 - LOS: 11 d

Parikh M, Pomp A, Gagner M. Laparoscopic conversion of failed gastric bypass to duodenal switch: technical considerations and preliminary outcomes.

Surg Obes Relat Dis 2007 Nov-Dec;3(6):611-8.

Results

- BMI

	Original	Lowest	Pre-DS	1y
	53.9	31.6	40.7	30.7

 - Weight loss 35.5 kg
- Complications
 - No leaks, 4 G-G strictures
 - 1 conversion to open

Keshishian et, Delano, CA, USA

- 46 patients (15 VBG, 26 GBP, 5 VBG-GBP)
 - BMI 47.3
 - 11y post op
- Perioperative data
 - OR-time 3.5 h (2.3-5.7)
 - LOS 4.8 d

• Keshishian A, Zahriya K, Hartoonian T, Ayagian C. Duodenal switch is a safe operation for patients who have failed other bariatric operations. *Obes Surg.* 2004 Oct;14(9):1187-92

Results

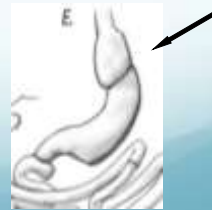
- BMI

	Original	Lowest	Pre-DS >2y	
•	53.2	34.0	49.2	30.8

- Weight loss 48 kg, 67 %EWL

- Complications

- 4 leaks (8.5%), GJ or above
Primary DS 0.9%



Our experience in Uppsala

- 3 cases GBP to DS
 - OR: 175 min, LOS: 6 d
 - Preop 153 kg, weight loss 1y: 34 kg
 - Compl: 0; 1 edema, 1 diarrhea
- 2 cases of distal-GBP
 - OR: 153 min, LOS: 4 d
 - Preop 126 kg, weight loss 1y: 20 kg

Comments

- Technically difficult
 - In spite of high experience in DS
 - Revisional operation
 - G-G leaks and strictures
- Modern lap-GBP
 - Small gastric pouches
 - Linear GJ reaches into distal esophagus

Metabolic effects

- Hypoglycemia generates hunger
- 10/11 patients with weight regain had abnormal glucose tolerance testing
- 6/11 had hypoglycemia
 - Roslin M et al. Surg Endosc. 2011:1926-32
- Dietary intervention!

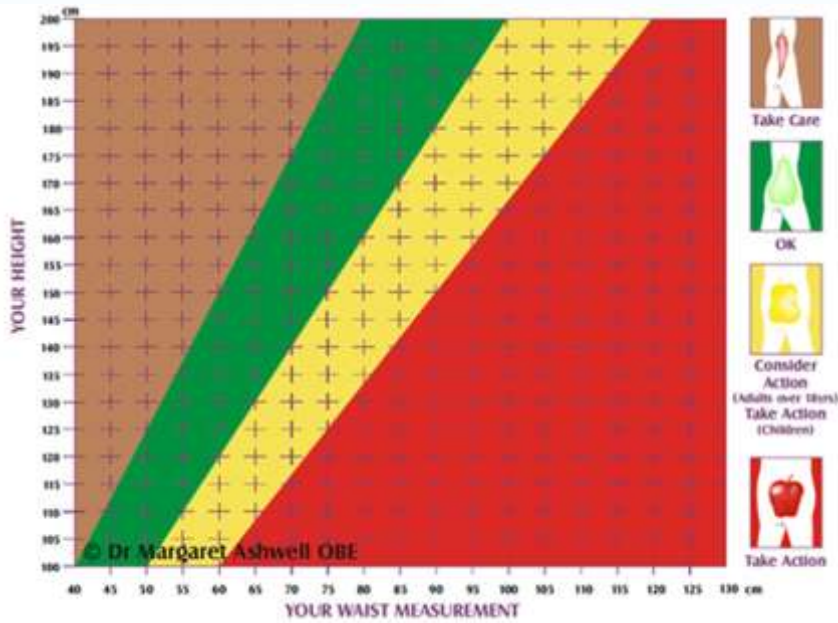
The team



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68



SOD

A pilot study of long-term effects of a novel obesity treatment: omentectomy in connection with adjustable gastric banding

A. Thorell¹, Y. Lissak², J. Apatzon³, G. Holm³ and F. Arner³

Int J of Obesity (2002) 26;193-199

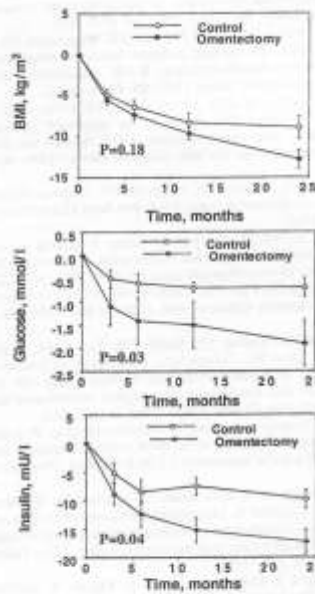


Figure 1 Changes from baseline over time in BMI and fasting plasma glucose and insulin. Omentectomy and control groups were compared by analysis of variance, repeated measure.

Iliac Transposition and Enteroglucagon/GLP-1 in Obesity (and Diabetic?) Surgery

Edward E. Mason, MD, PhD

Mason

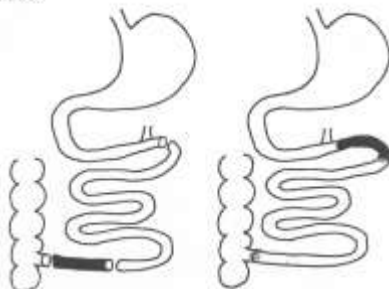


Figure 1. Diagram of isoperistaltic transposition of the ileum (modified from Ferri et al.³). A measured segment of distal ileum must be transferred with blood and nerve supply to a position just beyond the ligament of Treitz. Three anastomoses of small bowel would be required.

Table 1. Glucagon-like peptide 1 in type 2 diabetes mellitus

- Pancreatic glucagon inhibition
- Insulin secretion stimulation
- Insulin resistance decreased
- Gastric emptying prolonged
- Intestinal motility decreased

Obesity Surgery 9 (1999),223-228

New ideas

- Add behavioral treatment
- Select patients better.
- Support patients better.
- Less invasive procedures
 - Gastric pacing
 - Endoluminal duodenojejunal tubing
 - Intragastric balloon
 - Endoscopic banding

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72



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73




***Skräddarsydd kirurgisk
behandling vid viktrecidiv***

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 Biträdande professor, IKE
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Don't overegg the pudding

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