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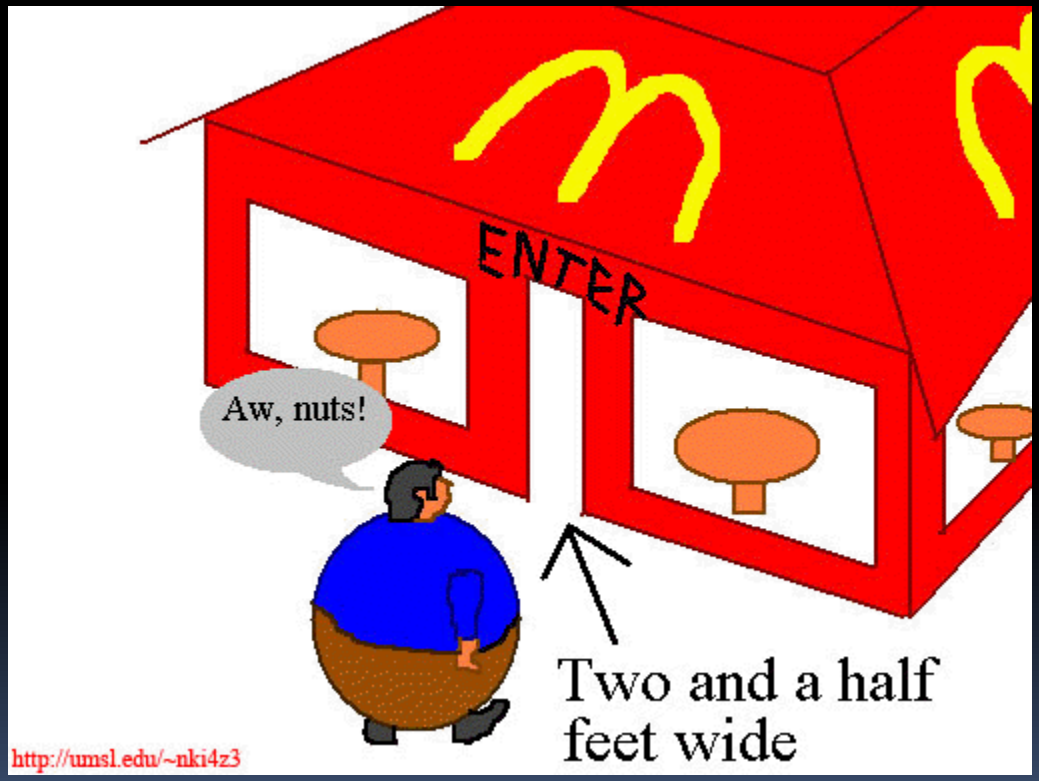
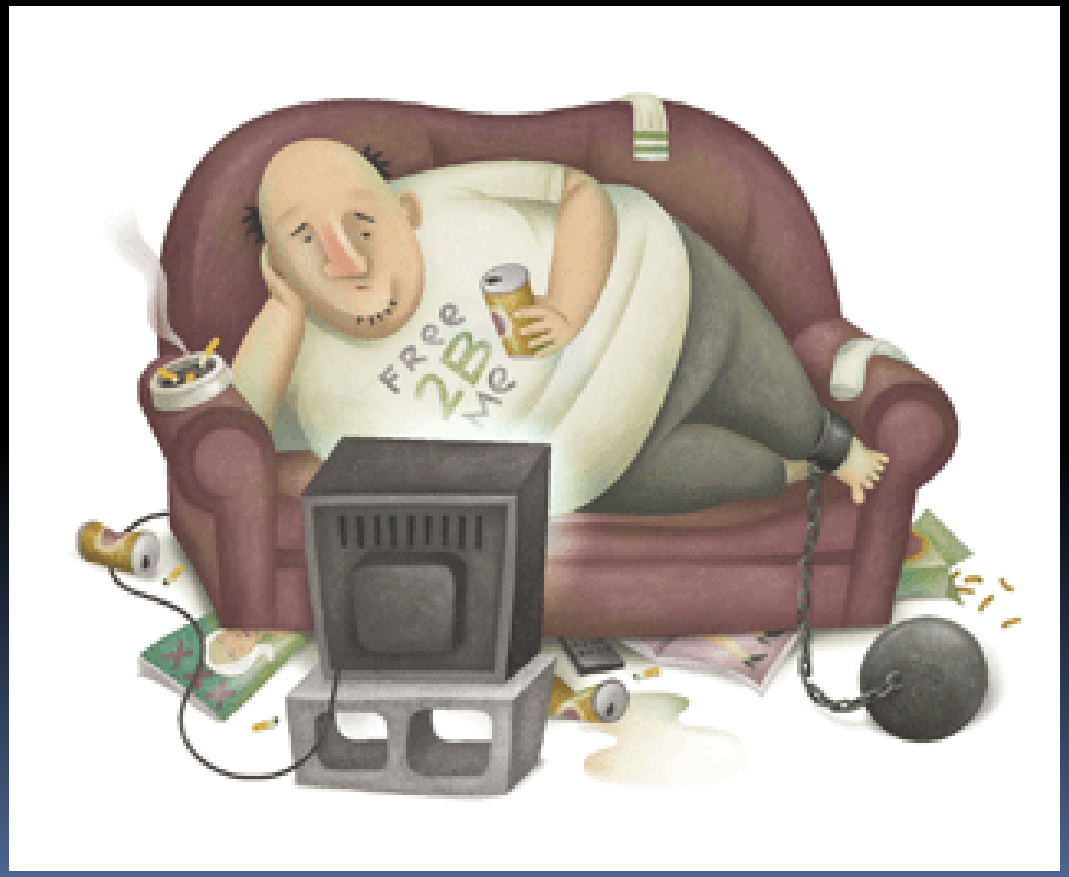
SURGERY FOR METABOLIC SYNDROME


2000 v. Chr...
2000 n. Chr...
EVOLUTION...

Dietary Trends



Lifestyle to Obesity



OBESITY

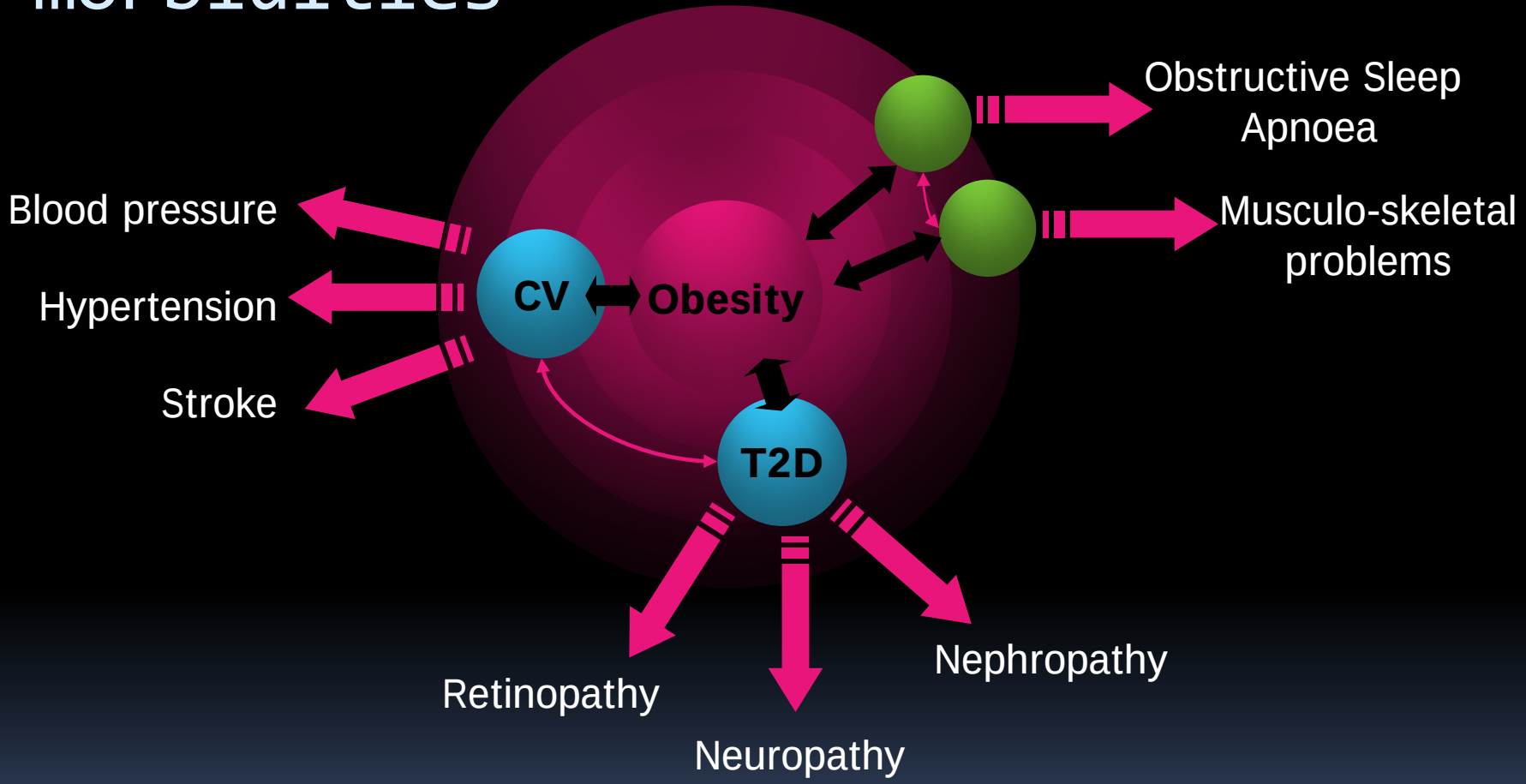
- Body Mass Index

  i.e. B.M.I. Is weight in kilograms divided by height in metres squared.
- B.M.I. > 30 kg/m^2 is Obesity
- B.M.I. > 35 is Morbid Obesity
- 17 % of U.K. Population is Obese.
- 2 % of U.K. Population is Morbidly Obese.

OPTIONS

- Untreated, an obese person has only a 1 in 7 chance of reaching Normal life Expectancy.
- Most obese patients are treated conservatively with:
  - Lifestyle advice
  - Dietary advice
  - Drugs
- Morbid obesity, however, requires surgery.

Obesity and related co-morbidities



[1] Adapted from Ashrafian H et al. Circulation 2008;**118**:2091–102.

The estimated increased risk of developing obesity-associated diseases

	Relative risk	
	Women	Men
Type 2 diabetes	12.7	5.2
Hypertension	4.2	2.6
Myocardial infarction	3.2	1.5
Colon cancer	2.7	3.0
Angina	1.8	1.8
Gall bladder disease	1.8	1.8
Ovarian cancer	1.7	--
Osteoarthritis	1.4	1.9
Stroke	1.3	1.3

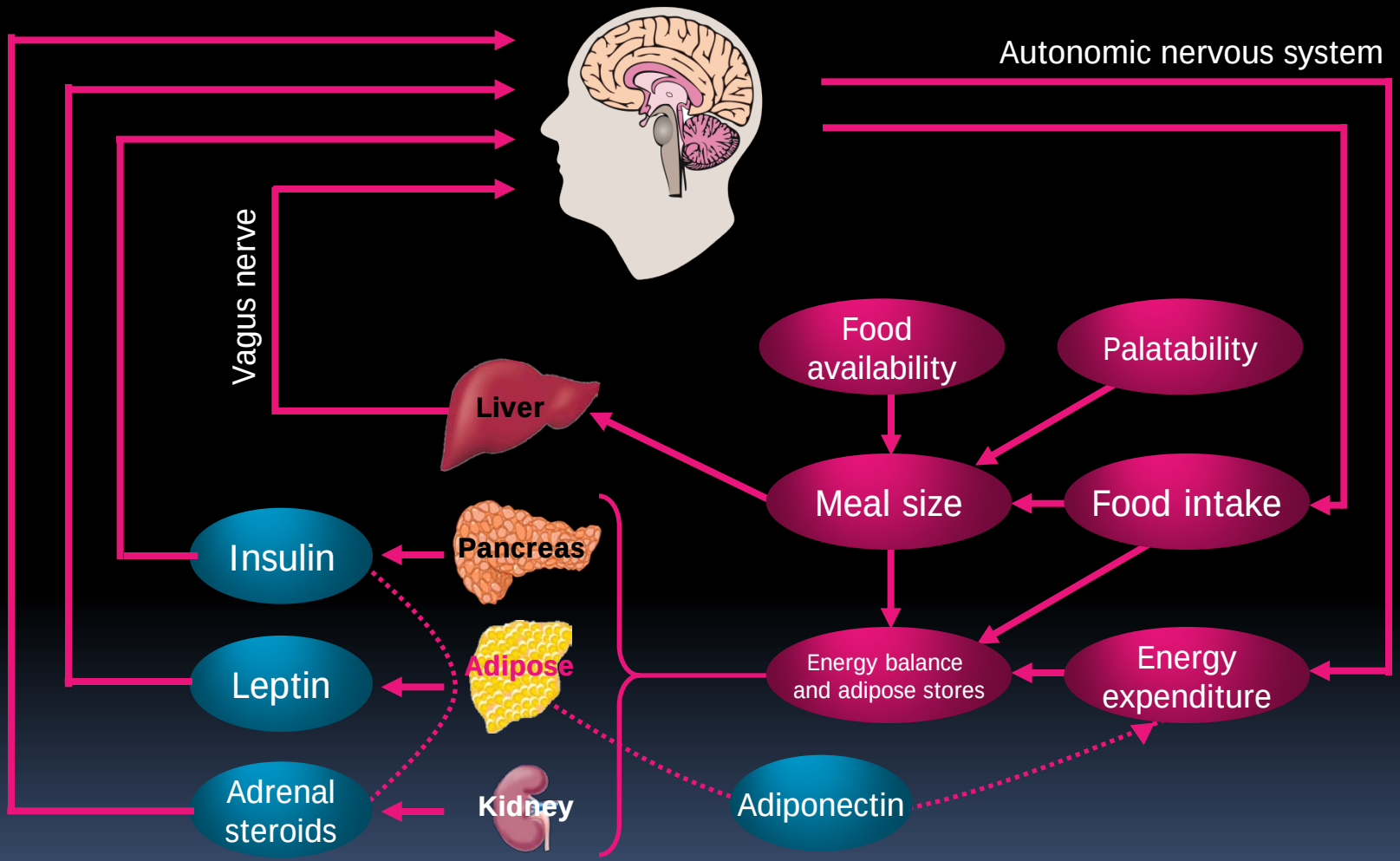
[1] National Audit Office. Tackling obesity in England. London: The Staionary Office, 2001.

The obesity epidemic

- In Europe, there will be 150 million obese adults by 2010 [1]
- 9,000 premature deaths a year in the UK are related to obesity [2]
  - In the 25 years up to 2004, the prevalence of obesity in the UK increased 400% [3]
- There are now more obese than overweight people in the USA [4]
  - >34% obese, compared to 32.7% who are overweight
- Between the National Health and Nutrition Examination Survey (NHANES) II and III, obesity rose from 14.5% to 22.5% [5]

[1] WHO. The challenge of obesity in the WHO European region and the strategies for response. Copenhagen: WHO, 2007. [2] Wanless. Our Future Secured? A review of NHS funding and performance, 2007. [3] House of Commons Health Committee. Obesity. Third report of session 2003–04. Volume 1. London: The Stationery Office, 2004. [4] National Center for Health Statistics, 2008. [5] Flegal KM et al. Int J Obesity 1998;**22**:39–47.

Weight is controlled by a complex feedback mechanism



[1] Adapted from Lopes H & Egan B. Arq Bras Cardiol 2006;**87**:489–498.

Metabolic syndrome

- Definition:
  - Insulin resistance/impaired glucose tolerance (Fasting glucose > 5.6 mmol/L)
  - BP >130/80
  - Raised Triglycerides (>1.7 mmol/L)
  - Low HDL (< 0.9 men, < 1.0 mmol/L women)
  - Central Obesity (waist >102 cm men, 88 cm women)

What does Metabolic Syndrome mean to patient?

- Increased risk of diabetes (quantify)
- Increased risk of cardiovascular disease (angina, CVA, MI, intermittent claudication)

Medical Treatment of Metabolic Syndrome

- Simvastatin 40mg (or equivalent)
- Aim for total Cholesterol < 5.0 mmol/L (if high risk of CVD – target = 4.0 mmol/L or less
- Blood pressure – medication (e.g. ACE inhibitor) target < 130/80 mmHg
- If diabetic – metformin first line

What should we do about it?

- Metabolic syndrome (insulin resistance, IGF)
  - Lose weight
    - Diet (Weight reducing and sugar free)
    - Exercise
    - Drugs (Orlistat)
    - Surgery
  - Address other risk factors for CVD
    - Hypertension BP<130/80
    - Lipids: Simvastatin 40mg or equivalent
    - Stop smoking
- Treat as if diabetes

Surgical treatment of the Metabolic Syndrome

- Buchwald et al: Jama (2004,292:1724-1732)

- Diabetes
- Resolved 76.8%
- Improved 86.0%

- Hyperlipidaemia
- Improved 70.0%

- Hypertension
- Resolved 61.7%
- Improved 78.5%

- Obstructive sleep apnoea
- Improved 85%

The benefits of 10% weight loss

		Reductions
Mortality risk	Total mortality	>20%
	Diabetes-related deaths	>30%
	Obesity-related cancers	>40%
Blood pressure	Systolic	10 mmHg
	Diastolic	20 mmHg
Diabetes	Fasting glucose	30–50%
	Risk of developing diabetes	50%
	HbA_{1c}	15%
Lipids	Total cholesterol	10%
	LDL-cholesterol	15%
	Triglycerides	30%

[1] Jung RT. Brit Med Bull 1997;**53**:307–21.

Pharmacologic obesity therapy has provided limited results

- May not sustain long-term weight loss in most patients [1–3]
  - Efficacy beyond 2 and 4 years is not established in clinical trials [1,3]
  - Only a minority of patients lose ≥10% of their weight [1,3]
- Appetite is not the only factor associated with obesity
  - Powerful forces drive eating
  - People may eat for comfort
  - Genetics and faulty metabolism

[1] Abbott Laboratories. Prescribing Information. Meridia Capsules; 2006. [2] Ioannides-Demos L et al. Drugs 2005;**65**:1391–418.
[3] Roche Laboratories I. Prescribing Information. Xenecal Capsules; 2007.

Bariatric Surgery

- Bariatric – Greek word
  - Bar = weight
  - Iatro = treatment
- Goal of treatment:

  Improve or resolve co-morbid conditions and to improve the quality of life by restoring metabolic and organ functions.

Eligibility Criteria For Surgery

- BMI > 40 or BMI >35 with obesity related co morbidity.
- Age 16 – 65 years.
- Acceptable medical / operative risks.
- Failed conservative treatment.
- Obese for a minimum of 5 years.
- Commitment to life – style changes.

Ineligibility Criteria

- Unsolved history of Alcohol / Drug Abuse.
- History of major Psychiatric illnesses.
- Hostile Un co-operative behaviour.
- Un-realistic expectations.
- Un-acceptable Medical risks.

NICE clinical guideline

- Consider surgery for obese patients where:
  - BMI >40 kg/m^2
  - BMI 35–40 kg/m^2 with other significant disease (e.g. T2D, high blood pressure) that could be improved with weight loss
  - All appropriate non-surgical measures have failed to achieve or maintain weight loss for at least 6 months
  - They are receiving or will receive intensive specialist management
  - They are generally fit for anaesthesia and surgery
  - They commit to the need for long-term follow-up
- Surgery is a first-line option for patients with a BMI >50 kg/m^2 in whom surgical intervention is considered appropriate

[1] NICE clinical guideline 43, 2006.

Bariatric Procedures

1. Restrictive.
2. Malabsorptive.
3. Combination of 1 & 2.

- Restrictive operations involve reducing capacity for food intake.
- Malabsorptive procedures involve re-arranging small bowel to decrease the functional length or efficiency for nutrient absorption.

Restrictive Procedures

- Jaw wiring
- Intra Gastric Balloon
- Lap Adjustable Gastric Banding
- Gastroplasties
  - Horizontal
  - Vertical
  - Vertical Banded Gastroplasty
- Laparoscopic Vertical Banded Gastroplasty
- Sleeve gastrectomy

Malabsorptive Procedures

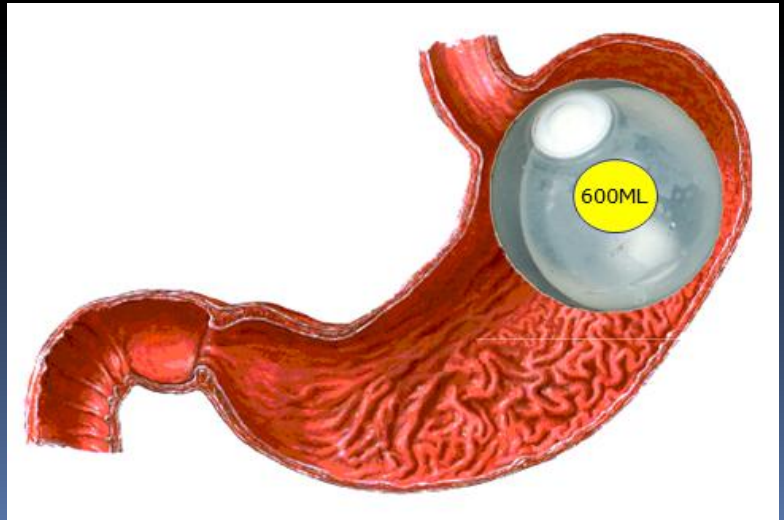
- Jejuno ileal bypass
- Gastric bypass
- Bilio-pancreatic bypass
- Duodenal Switch

Jaw Wiring

- Sounds inhumane.
- Patient often breaks wiring.
- Eats / Drinks liquidated Mars Bars.
- Rebound weight gain as soon as wiring is removed.

Gastric Balloon

- Not permanent.
- Deflation of balloon may occur.
- Obstruction.
- Contra – indicated in with previous abdominal surgery.

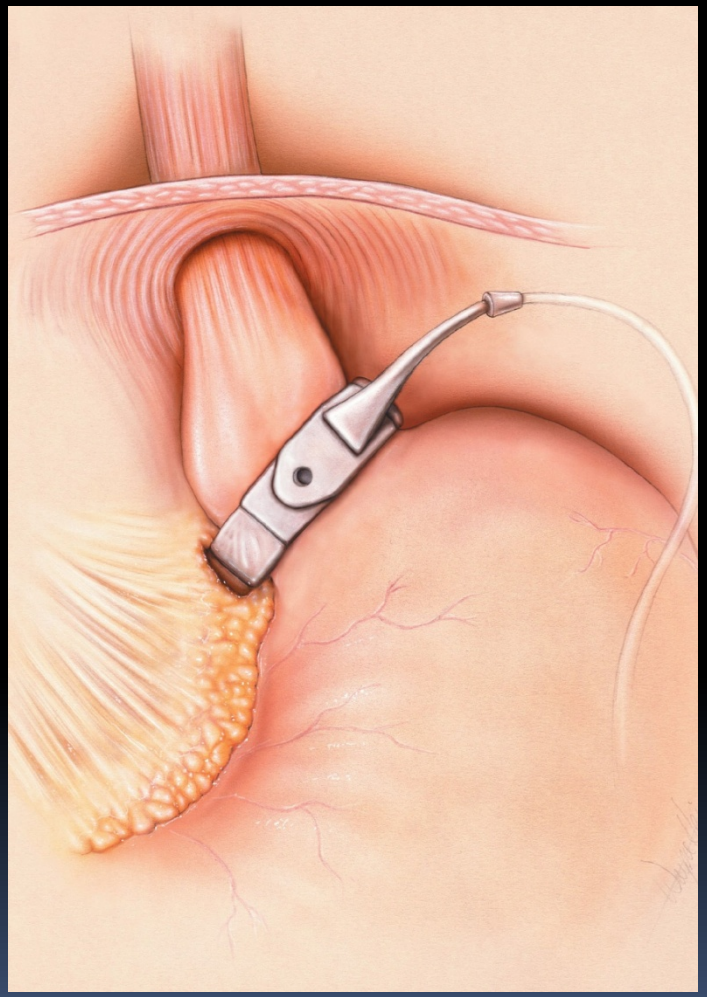


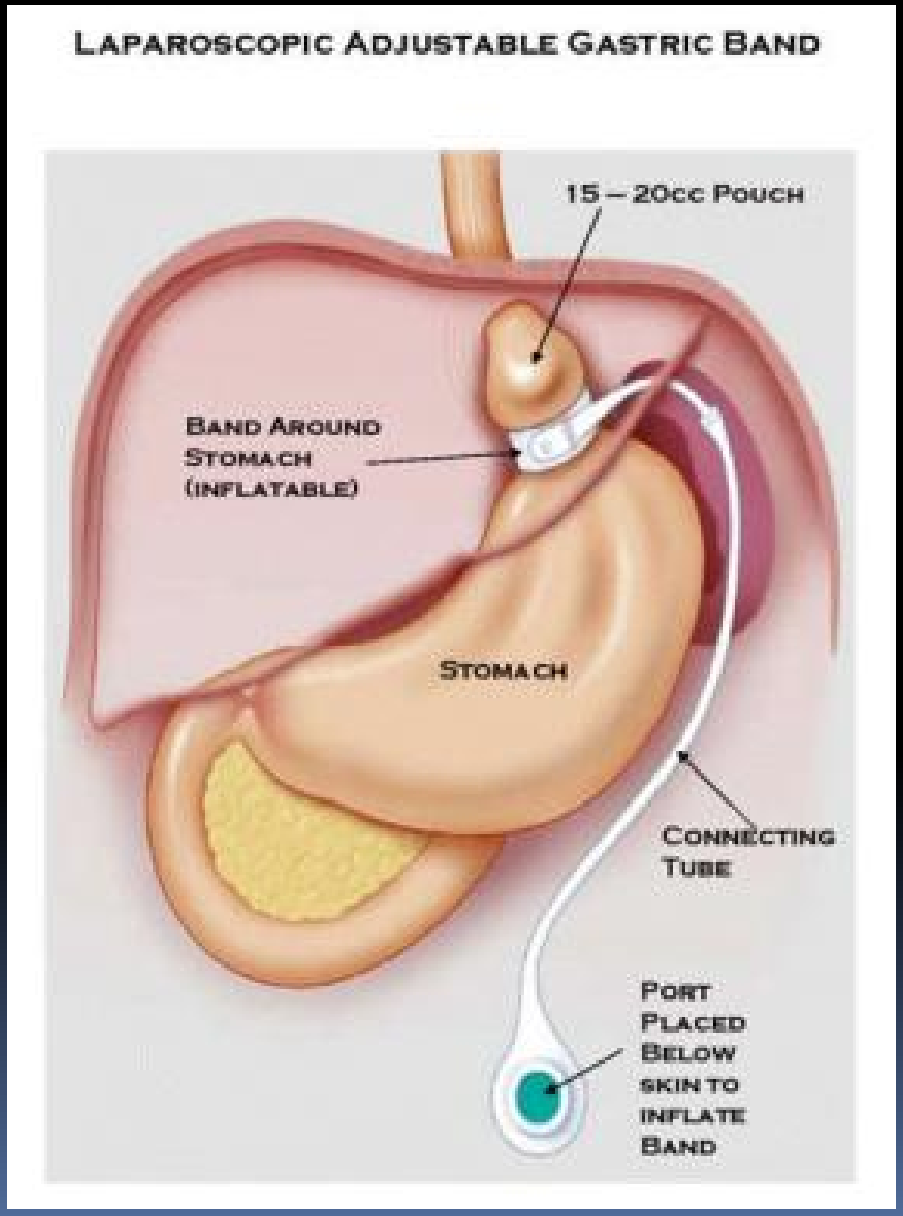
Gastric Banding

- Prosthetic band is encircled around the proximal stomach and compartmentalized into a small pouch and a large remnant.
- Adjustable gastric banding – by using saline injectable gastric band with reservoir buried subcutaneously.
- Laparoscopically.
- Can be done as a day case surgery

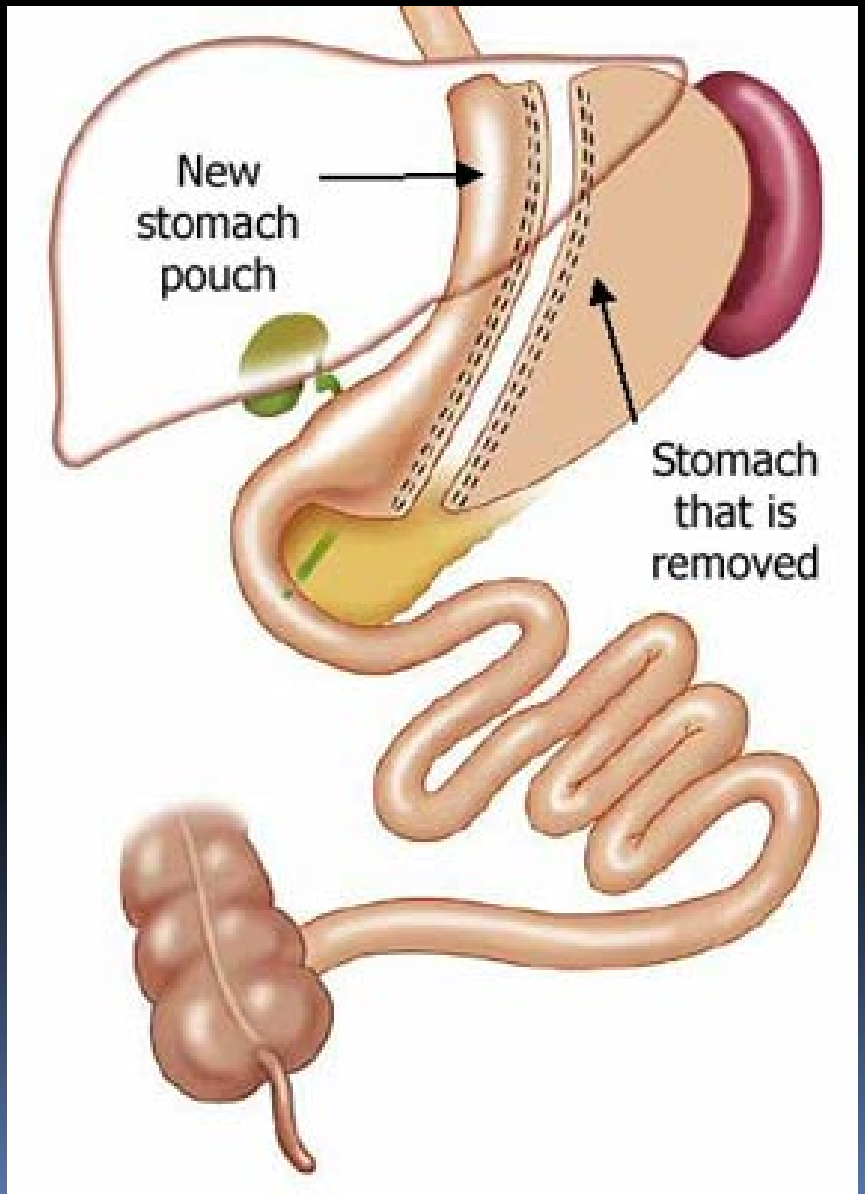
Lap adjustable band

- A silicon band attached to a subcutaneous port is placed around the proximal stomach [1]
- Injection of isotonic fluids into the port hydraulically inflates the band [1]
- Advantages [2]
  - Relatively minor surgery
  - Reversible and adjustable
  - Low operative complication rate
  - Lower risk of gallstones
  - Return to work 1 week after surgery
- Disadvantages
  - Requires an implanted medical device
  - Easier to 'cheat'
  - Risk of prolapse or slippage




LAPAROSCOPIC ADJUSTABLE GASTRIC BAND
15 – 20cc POUCH
BAND AROUND STOMACH (INFLATABLE)
STOMACH
CONNECTING TUBE
PORT PLACED BELOW SKIN TO INFLATE BAND

Sleeve gastrectomy

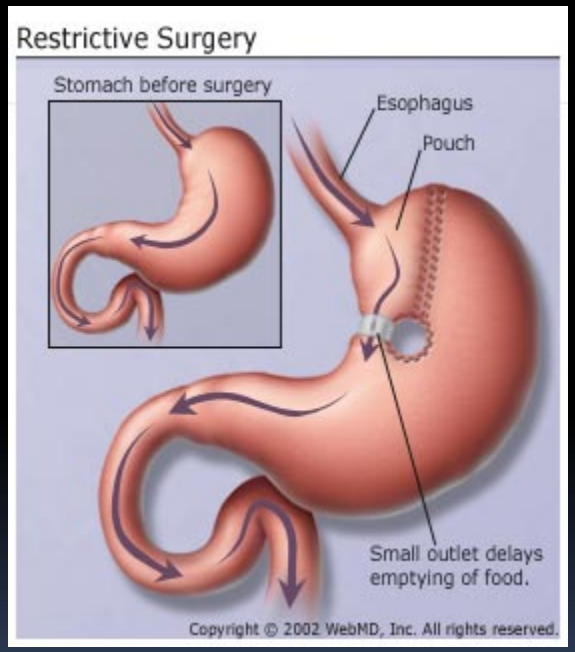


Gastroplasties

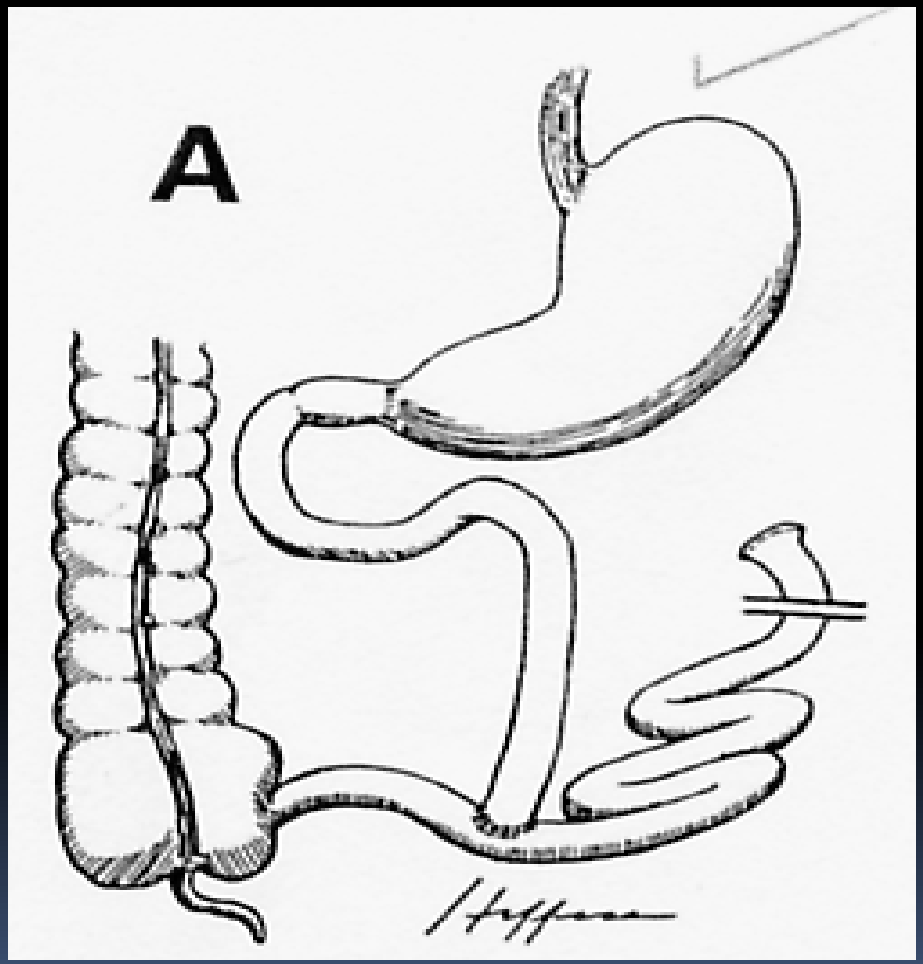
Horizontal (now obsolete).

Vertical
- Open Surgery
- Laparoscopic

Types of surgery



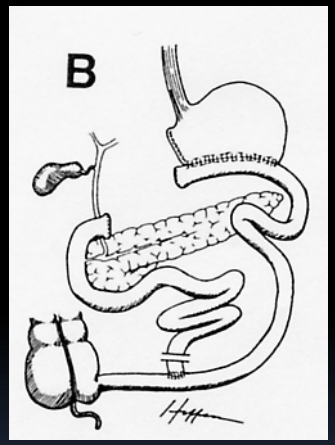
J-I Bypass



Jejuno Ileal Bypass

- Proximal Jejunum anastomosed to distal Ileum(14/4).
- Very successful weight loss.
- Complications:
  - Severe metabolic and Electrolyte disturbance.
  - Vitamin Deficiencies
  - Intractable Diarrhoea
  - Cholelithiasis
  - Urolithiasis
  - Liver Failure
  - Arthritis
- Nearly 30% pts require reversal to treat complications
- Procedure abandoned

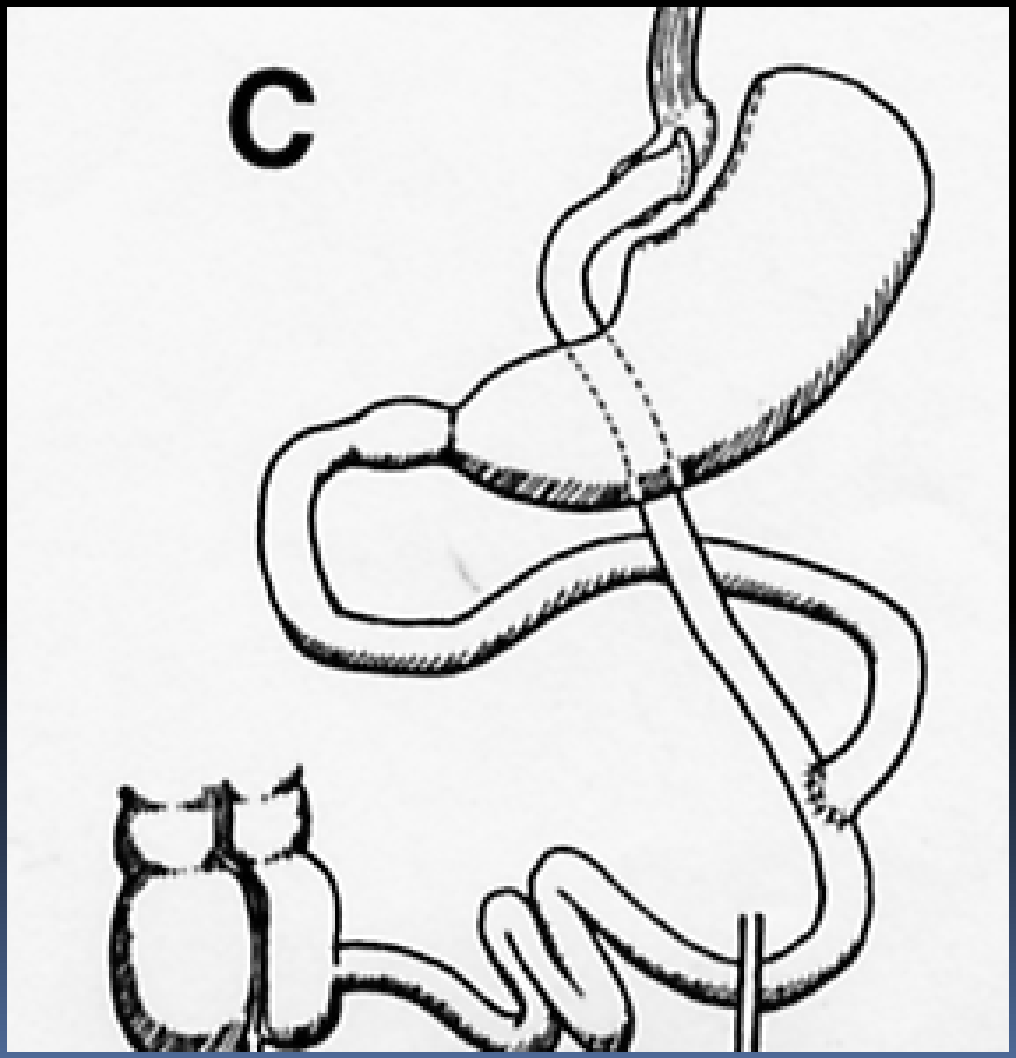
Biliopancreatic Diversion & Duodenal Switch



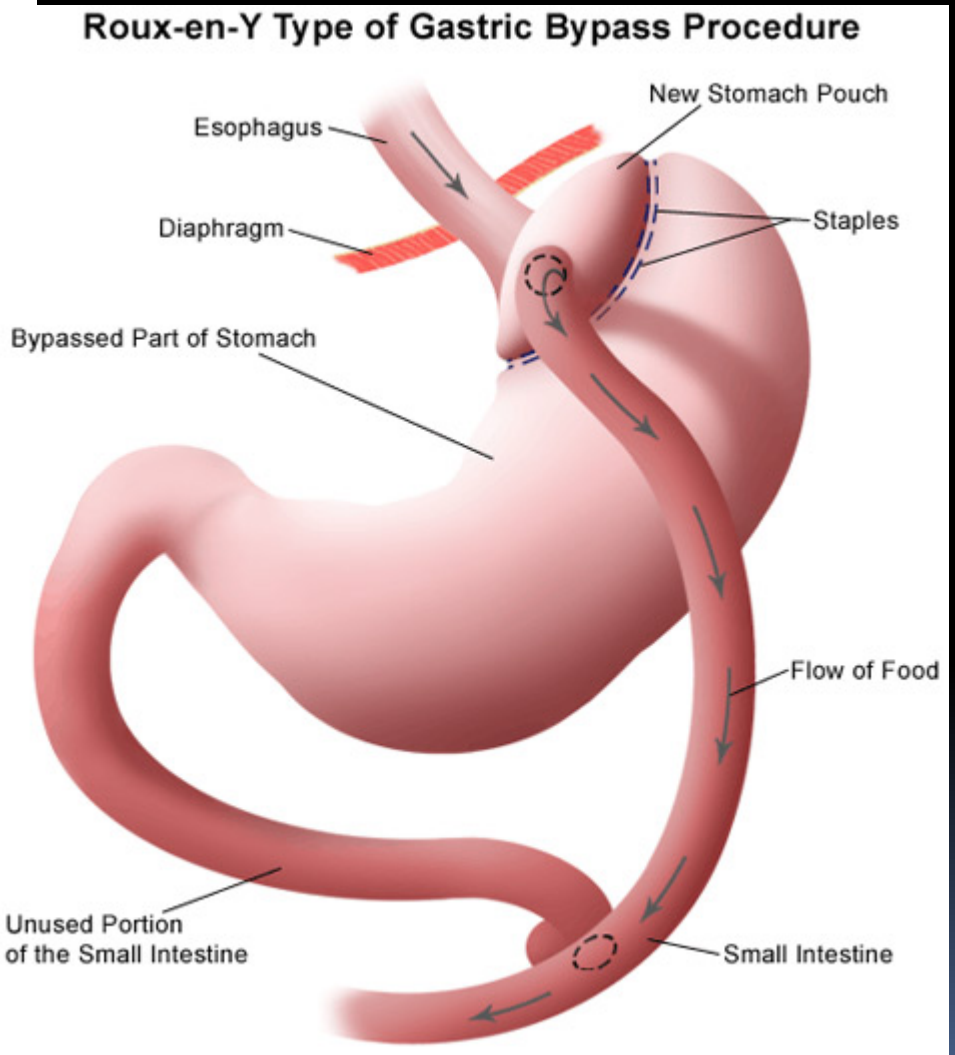
B-P Diversion & Duodenal Switch

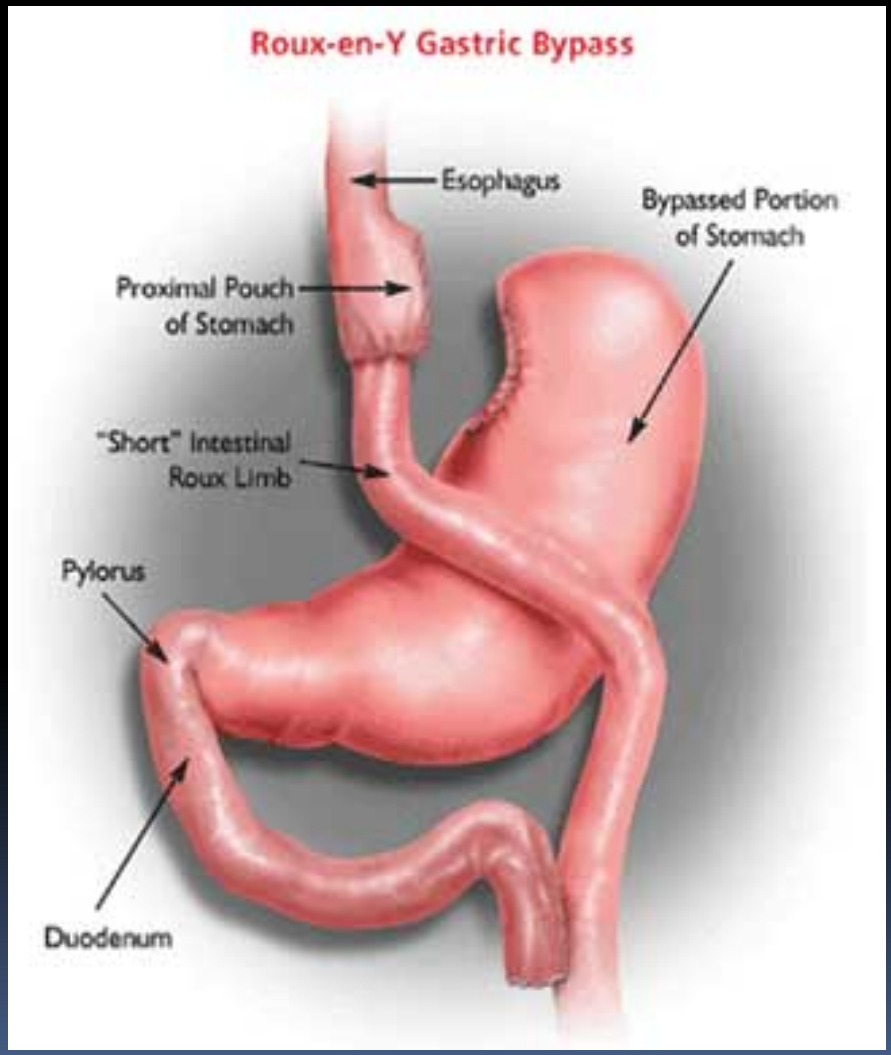
- Biliary and pancreatic secretions diverted to distal 50cm of ileum.
- Recommended for Supermorbid
- Protein calorie malnutrition
- Metabolic bone disease
- Fat soluble vitamins deficiency
- Iron calcium and B12 deficiency

Gastric Bypass



Types of surgery





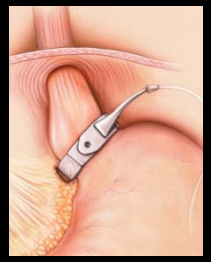
Laparoscopic Gastric Bypass

- Upper Stomach stapled across (pouch of 50 ml)
- Gastro-enterostomy with a Roux limb of 100-150 cms
- Weight loss achieved due to :
  - Gastric Restriction
  - Nutrient malabsorption
  - “Dumping” syndrome- hence patient avoids “sweet” foods.

Gastric Bypass Complications

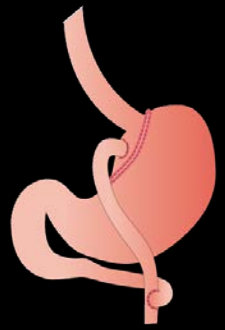
- Early
  - Leak
  - Acute gastric dilatation
  - Roux – Y Obstruction
  - Wound infection/Seroma
- Late
  - Stomal stenosis
  - Anemia
  - Vit B12 Deficiency
  - Calcium Deficiency/ Osteoporosis
  - Disruption of staple line

Making the surgical choice: banding versus bypass



Gastric banding

- Minimally invasive and reversible
- Less effective in the long term
- Risk of slippage or erosion
- Associated with a significantly lower risk of serious complications and mortality than bypass
- Possible to 'cheat' by eating high sugar foods



Gastric bypass surgery

- Irreversible surgery (?)
- Rapid weight loss
- Requires careful follow up to manage nutritional deficiencies
  - Inadequate follow up may result in osteoporosis, anaemia and blood clotting problems
- Discourages sweet eating due to 'dumping' syndrome

Pre-operative Evaluation

- Patients selection for obesity surgery
  - Motivation
  - Absence of Psychosis or Substance abuse
  - Understanding and acceptance
  - Willingness to actively participate

Obesity Management

- Surgeon and General Practitioners
- Gastroentrologist/Endocrynologist
- Dietician
- Radiologist
- Anesthesiologist

Post-Operative Management

- Prior to discharge
  - Gastrografin swallow
  - Oral fluids
- Post Op Diet
  - First four weeks-Liquid diet
  - Four to six weeks-Slushy food
  - After six weeks solid food

Post Op follow up

- Surgeons
- Dietician
- ?? Psychologist
- Exercise program

Complications

- "Rapid pulse"

  (Pulse rate of more than 120 beats per minute)

  - Due to

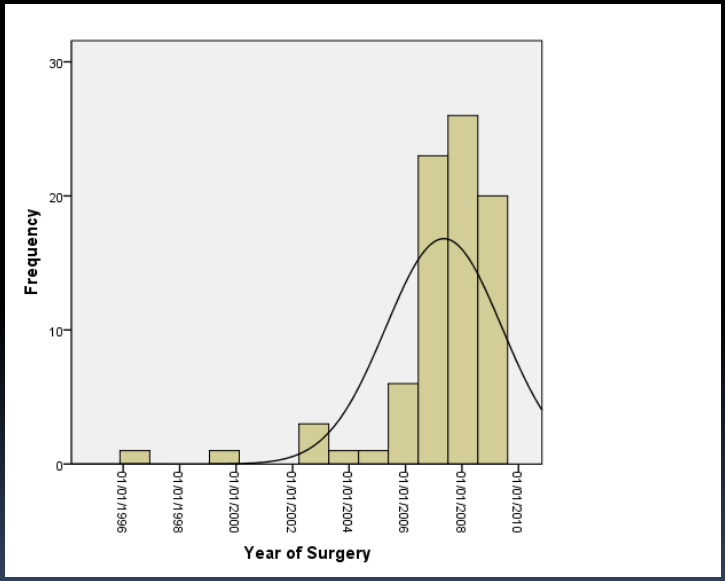
    Acute gastric dilatation

    Acute afferent loop syndrome

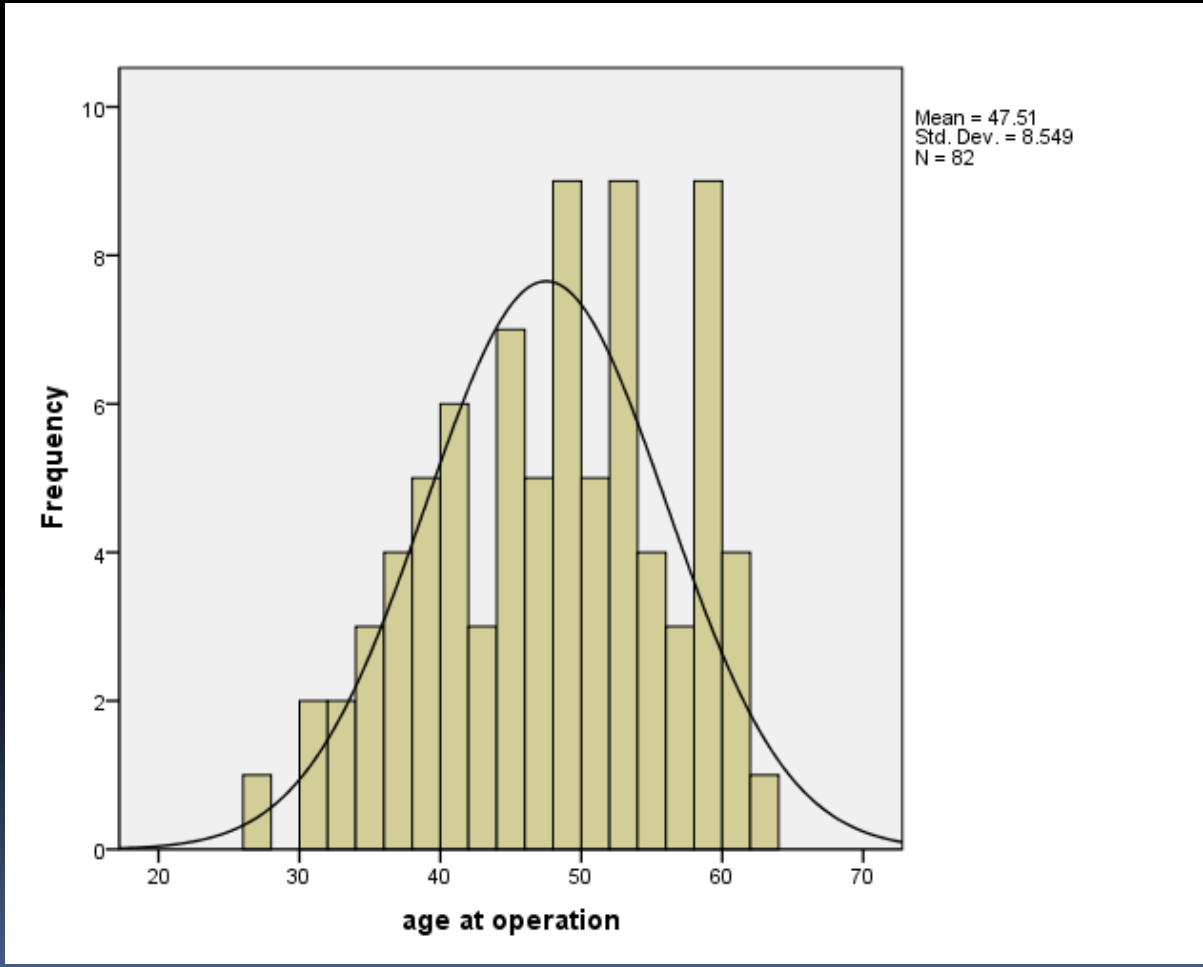
    Peritonits

OBESITY SURGERY AND DIABETES

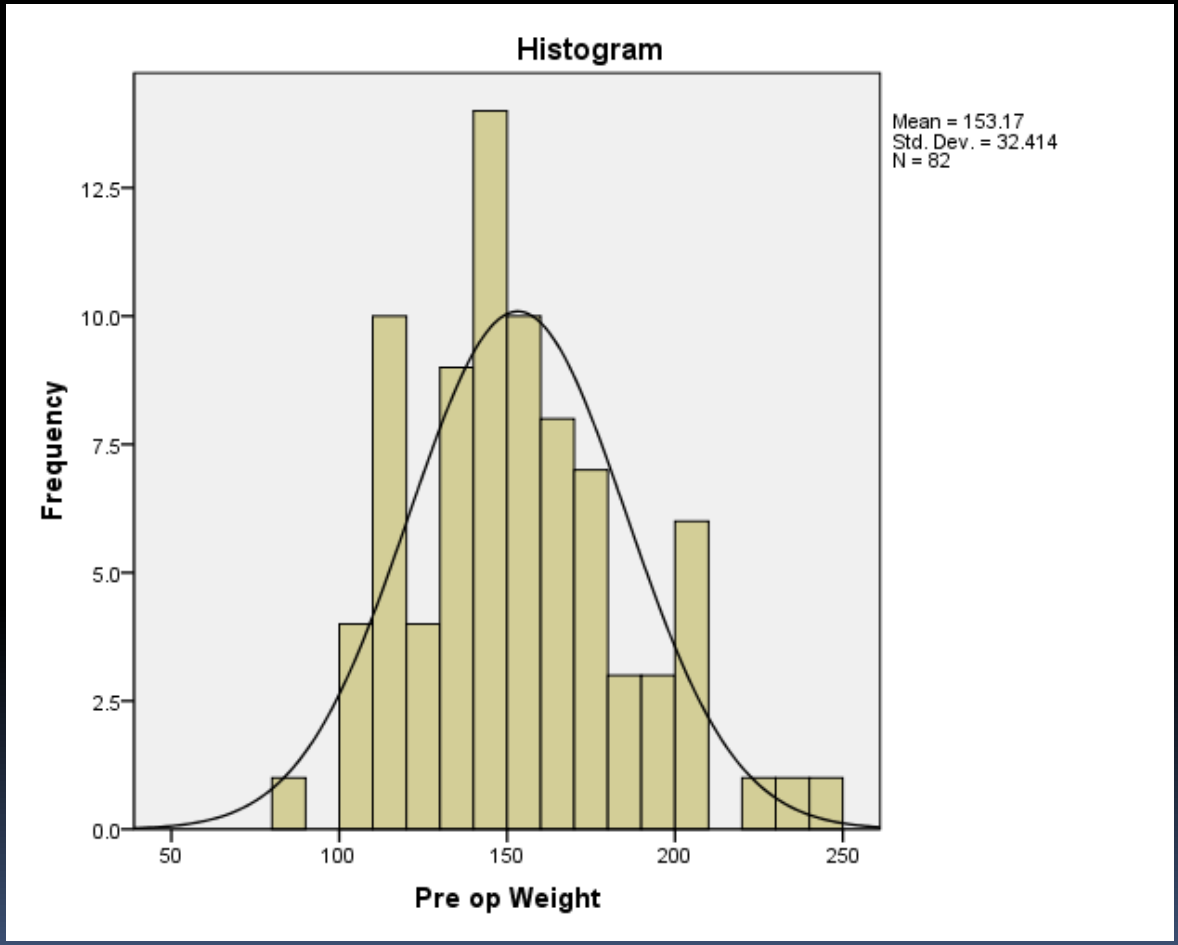
- 82 Type II Diabetic patients identified b/w August 1995 till March 2009.



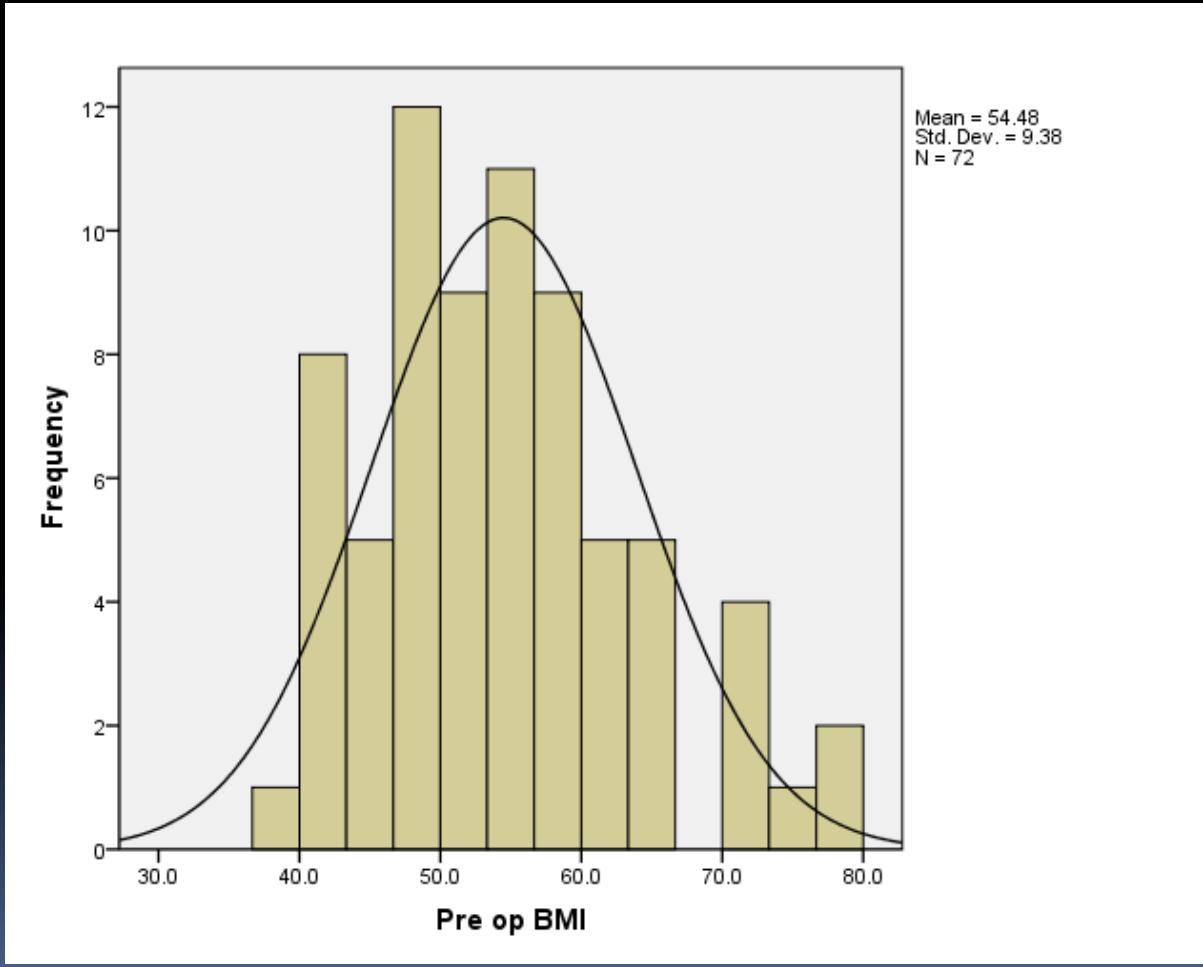
AGE


Mean = 47.51
Std. Dev. = 8.549
N = 82
Frequency
0
2
4
6
8
10
20
30
40
50
60
70
age at operation

PRE –OP WEIGHT



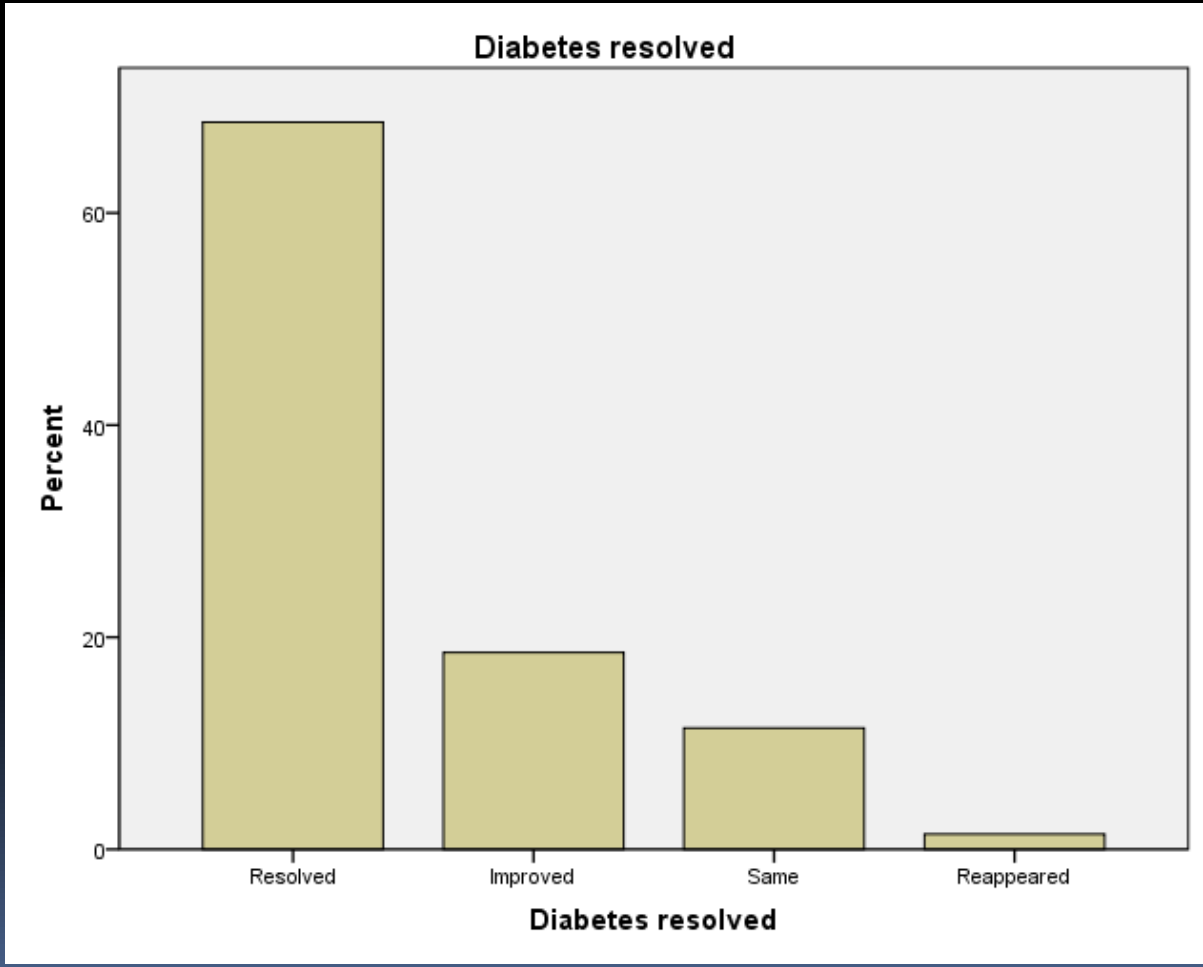
PRE-OP BMI


Mean = 54.48
Std. Dev. = 9.38
N = 72
Frequency
0
2
4
6
8
10
12
30.0
40.0
50.0
60.0
70.0
80.0
Pre op BMI

BMI IMPROVEMENT

	Pre op BMI	BMI at 1st FUp	BMI at 2nd FUp	BMI at 3rd Fup
Mean (Min – Max)	54.8 (37.1-79)	45.26 (32 – 67)	41.9 (28 - 57)	37.3 (27 - 57)
SD	9.3	7.95	7.7	7.4

DIABETES RESOLUTION



INCIDENCE OF SYMPTOMATIC GALLSTONES

- Selected patients having Bariatric Surgery at Manor Hospital Walsall between 1995 till 2008.

- Questionnaire sent out to 240 patients selected from Bariatric data base.

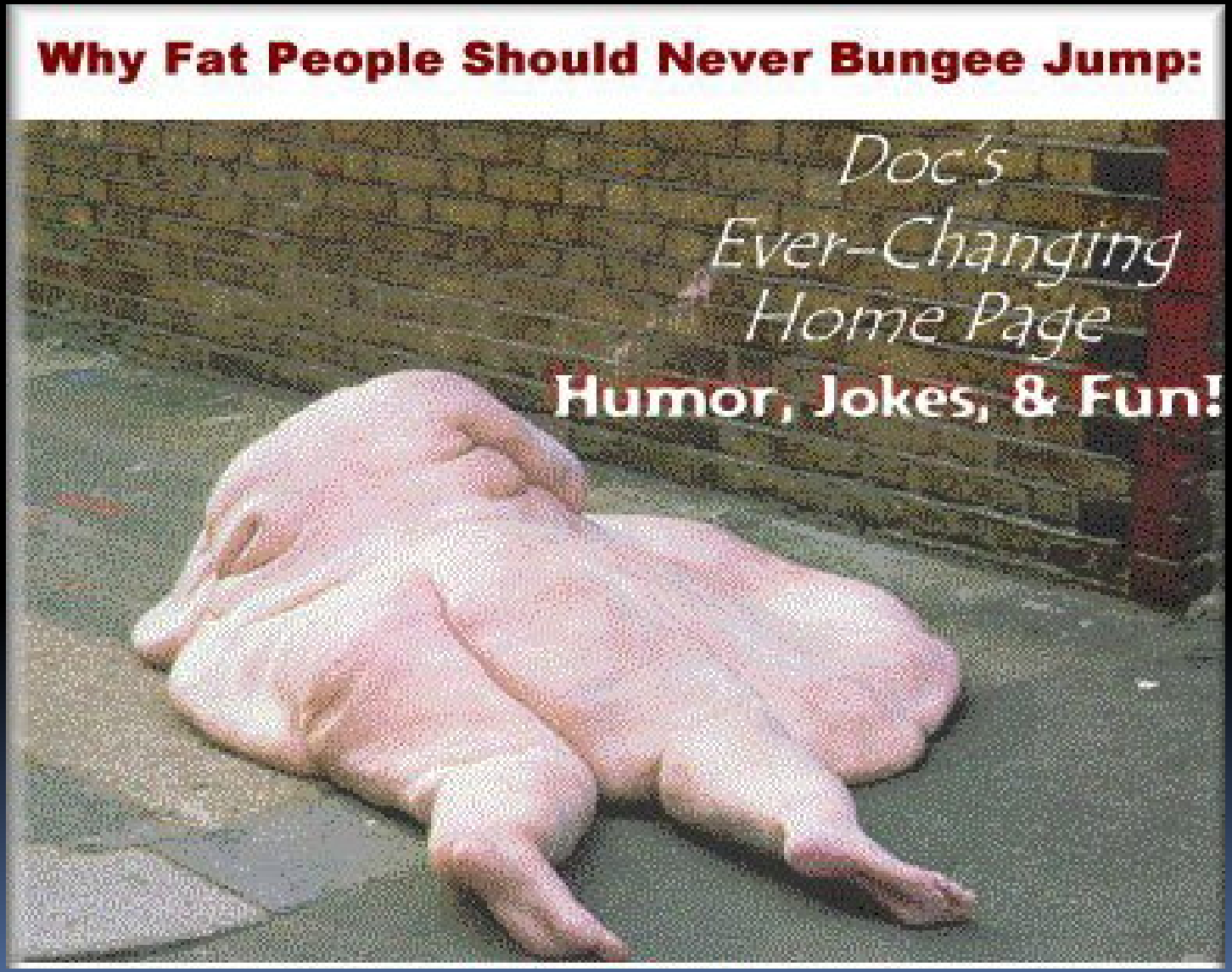
INCIDENCE OF SYMPTOMATIC GALLSTONES

- 190 completed questionnaire received
- 84% Female and 16% Male
- Average age 47 range from 24 – 69
- Time since obesity surgery 1 year – 14 years

- Weight lost range from 6kgs – 152 kgs
  Average weight lost 53 kgs.

- Only 13 % had developed gall stones however only 7% required cholecystectomy following gastric bypass surgery.

Questions Please



REFRENCES

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[3] Roche Laboratories I. Prescribing Information. Xenecal Capsules; 2007.

[1] NICE clinical guideline 43, 2006