1953, Varco

JIB: end-to-end jejunileostomy with ileocece stomy

1954, Kremen
Linner and Nelson

JIB: end-to-end jejunileostomy with ileocece stomy

1969, Payne
and DeWend

JIB: classic 14” + 4” end-to-side jejunileostomy

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The Modern Intestinal Bypass

- 1979 – Scopinaro – BPD: physiologist, IFSO founder, honorary president
- 1993 – Hess – BPD with DS: innovator, champion
- 1993 – Marceau – BPD with stapled DS: innovator, historian
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Malabsorptive/Restrictive
Producers: Gastric Bypass

1967, Mason and Ito
GIB: gastric transection
with loop gastrojejunostomy

1977, Alden
GIB: horizontal gastric stapling
with loop gastrojejunostomy

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1977, Griffen

GIB: horizontal gastric stapling with roux gastrojejunostomy

1983, Torres, Oca and Garrison

GIB: vertical gastric stapling with roux gastrojejunostomy

1987, Torres and Oca

GIB: vertical gastric stapling with roux gastrojejunostomy and long biliopancreatic limb

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1991, Fobi

GIB: vertical gastric division with interposed roux gastrojejunostomy and proximal silastic ring

1994, Wittgrove and Clark

GIB: laparoscopic roux GIB

1999, Higa

GIB: laparoscopic roux GIB with hand-sewn gastrojejunostomy
Purely Restrictive Producers:
VBG and LAGB

1971, Mason and Printen
Gastroplasty: partial gastric transection, greater curvature conduit

1981, Laws
Gastroplasty: silastic ring vertical gastroplasty
1982, Mason
Gastroplasty: vertical banded gastroplasty

1986, Eckhout and Willbanks
Gastroplasty: silastic ring vertical gastroplasty using notched stapler

1986, Kuzmak
Gastric band: adjustable silastic

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1998, Niville

Gastric band:
laparoscopic adjustable esophago-gastric silastic band

1999, Cadiere

Gastric band:
laparoscopic adjustable silastic band by distal robotics

Other Producers:
Gastric Balloon, Gastric Pacing
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1999, Ciğaina

Gastric electrode bipolar pulsation

Focusing on 4 obesity comorbidities:
- obesity
- hyperlipidemia
- hypertension
- obstructive sleep apnea

Results: Data Retrieval

2738 citations identified

1772 studies rejected before screening

961 studies retrieved

253 Studies rejected by screening

708 studies

572 studies for catalog only

136 studies (91 kin) qualifying for meta-analysis

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Results: Studies Selected

- Total: 134 primary studies (2 health care economics studied excluded from 136 for no efficacy or mortality data) (179 study groups, 22,049 patients)
- 5 randomized controlled trials (9 study groups, 621 patients)
- 28 nonrandomized controlled trials (48 study groups, 4,613 patients)
- 101 uncontrolled case series (122 study groups, 16,860 patients)

Results: Study Characteristics

- 56 studies North America
- 58 studies Europe
- 20 studies elsewhere

Results: Patient Characteristics

- Gender:
  - 19% men
  - 73% women
  - 8% not reported
- Age: x39 (range, 16-64)
- Baseline BMI: x46.85 (range, 32.30-68.80)
**Results: Weight Loss**

- **Total population:**
  - % EWL: 61.2% (95% CI, 58.1-64.4)
  - ↓ BMI: 14.2 kg/m² (95% CI, 13.3-15.1)
  - ↓ absolute weight: 39.7 kg (95% CI, 37.2-42.2)
  - all weight loss reductions p < 0.001

**Results: Operative Mortality (≤ 30 Days)**

- Purely restrictive - 0.1%
  (n = 2,297 gastric banding, n = 749 gastroplasty)
- Gastric bypass - 0.5%
  (n = 5,644)
- Biliopancreatic diversion/duodenal switch - 1.1%
  (n = 3,030)

**Results: Outcomes – Diabetes**

- **Total population with diabetes:**
  - resolution - 76.8% (70.7-82.9)
  - resolution or improvement 86.0% (78.4-93.7)
  - reduction FBG 13.33 mg/dL (10.81-15.86)
  - All values p < 0.01

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Results: Outcomes – Diabetes

- **Surgical groups % resolution:**
  - gastric banding: 47.9% (29.1-66.7)
  - gastroplasty: 71.6% (55.1-88.2)
  - gastric bypass: 83.7% (77.3-90.1)
  - biliopancreatic diversion / duodenal switch: 98.9% (96.8-100)
- All values p < 0.01

Results: Outcomes – Hyperlipidemia

- **Patients improved with hyperlipidemia:**
  - total population: 79.3% (68.2-90.5)
  - gastric banding: 58.9% (28.2-89.6)
  - gastroplasty: 73.6% (60.8-86.3)
  - gastric bypass: 96.9% (93.6-100.0)
  - biliopancreatic diversion / duodenal switch: 99.1% (97.6-100.0)
- All values p < 0.01

Results: Outcomes - Hypertension

- **Total population with hypertension:**
  - resolution: 61.7% (55.6-67.8)
  - resolution or improvement: 78.5% (70.8-86.1)
- All values p<0.01
**Results: Outcomes – Obstructive Sleep Apnea**

- Total populations with obstructive sleep apnea:
  - resolution - 85.7% (79.2-92.2)
  - resolution or improvement - 83.6% (71.8-95.4)
  - apneas or hypopneas - 33.8/hr (17.47-50.23)
- All values $p < 0.01$

**Conclusion**

A substantial majority of morbidly obese patients with diabetes, hyperlipidemia, hypertension, and/or obstructive sleep apnea have total resolution or marked improvement of their comorbid conditions after bariatric surgery.

**Bariatric Surgery Effect on Comorbidities**

A) Medical – reversal or improvement proven:

1. type 2 diabetes
2. hyperlipidemia
3. hypertension
4. obstructive sleep apnea
5. cardiac function failure
6. asthma
7. back strain and disk disease
8. weight-bearing osteoarthritis hips, knees, ankles, feet
9. gastroesophageal reflux disease
10. non-alcoholic fatty liver disease and cirrhosis
11. stress incontinence
12. polycystic ovary syndrome
13. intertriginous dermatitis
14. pseudotumor cerebri
15. depression
Bariatric Surgery Effect on Comorbidities

B) Medical – reversal or improvement reasonable and presumed:
1. cardiac and peripheral vascular disease
2. incidence of CVA
3. incidence of thrombophlebitis and PE
4. incidence of cholelithiasis
5. obstetric and fetal complications
6. carpal tunnel syndrome
7. carcinoma breast
8. carcinoma uterus
9. carcinoma ovary
10. carcinoma prostate
11. carcinoma colon
12. carcinoma pancreas
13. carcinoma liver

The impact of the massive weight loss by bariatric surgery on obesity would increase life expectancy

Bariatric Surgery Effect on Longevity

Survival by Group

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<table>
<thead>
<tr>
<th>Year of follow-up</th>
<th>Bariatric</th>
<th>Control</th>
<th>Absolute difference</th>
<th>Cost ratio: control / bariatric</th>
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<td>$3,609,680</td>
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<td>4</td>
<td>$18,541,503</td>
<td>$20,183,918</td>
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<td>1.09</td>
</tr>
</tbody>
</table>


We Cannot Afford to Treat Morbid Obesity with Bariatric Surgery

We Cannot Afford Not to Treat Morbid Obesity with Bariatric Surgery
Bariatric Surgery Worldwide

Traditional Trend: Convergence to the Center

Predicted Trend: Divergence from the Center

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Bariatric Surgery: Who Is a Candidate

BMI $\geq 40$ or $\geq 35$ in the presence of significant comorbidities

Having tried non-operative diet therapy

Bariatric Surgery: Who Is Not a Candidate

- Age – no contraindication
  - adolescents
  - over 65
- Race, sex, habitus – no contraindication
- Comorbidities – no contraindication
- Mental status – qualified contraindication
- Mental capacity – qualified contraindication
- Personal decision – Martin data

Care of the Adolescent Patient

1. BMI guidelines identical to adults
2. Physiologic maturity ($\geq 95\%$ predicted adult stature)
3. Cognitive and psychological capacity
4. Specialized centers with a multidisciplinary team
Recommendations

1. Multidisciplinary team approach and available additional clinical expertise

2. Surgical candidates should have attempted weight loss by non-surgical treatment options

3. Surgical candidates should have a comprehensive medical evaluation but evaluation by subspecialists (e.g., cardiologists, psychiatrists/psychologists) is not routinely needed

4. Currently recommended procedures: gastric bypass, laparoscopic adjustable gastric banding, vertical banded gastroplasty, and biliopancreatic diversion / duodenal switch

5. Surgeons should be receptive to change and new procedures

6. Both open and laparoscopic surgery are the standard of care

7. Further experience should be obtained in adolescents

8. Consideration should be given to extending the benefits of bariatric surgery to class 1 obesity (BMI 30 kg/m² to 34.9 kg/m²) patients, who have a condition that can be cured or markedly improved by substantial and sustained weight loss

9. Critical examination of the cost/benefit ratio of bariatric surgery

10. Increased clinical investigation, basic research, and education

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Bariatric Surgery: Conclusions

- Bariatric surgery is the current treatment of choice for morbid obesity
- Bariatric surgery is relatively safe, reverses the comorbidities of morbid obesity, improves quality of life, increases life expectancy, and is cost effective
- Every clinician will need to treat morbid obesity and needs to be familiar with bariatric surgery