Prevention of diabetes – possible and feasible?

Is bariatric surgery the final solution?

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VÄSTRA GÖTALANDSREGIONEN

Is bariatric surgery the final solution?

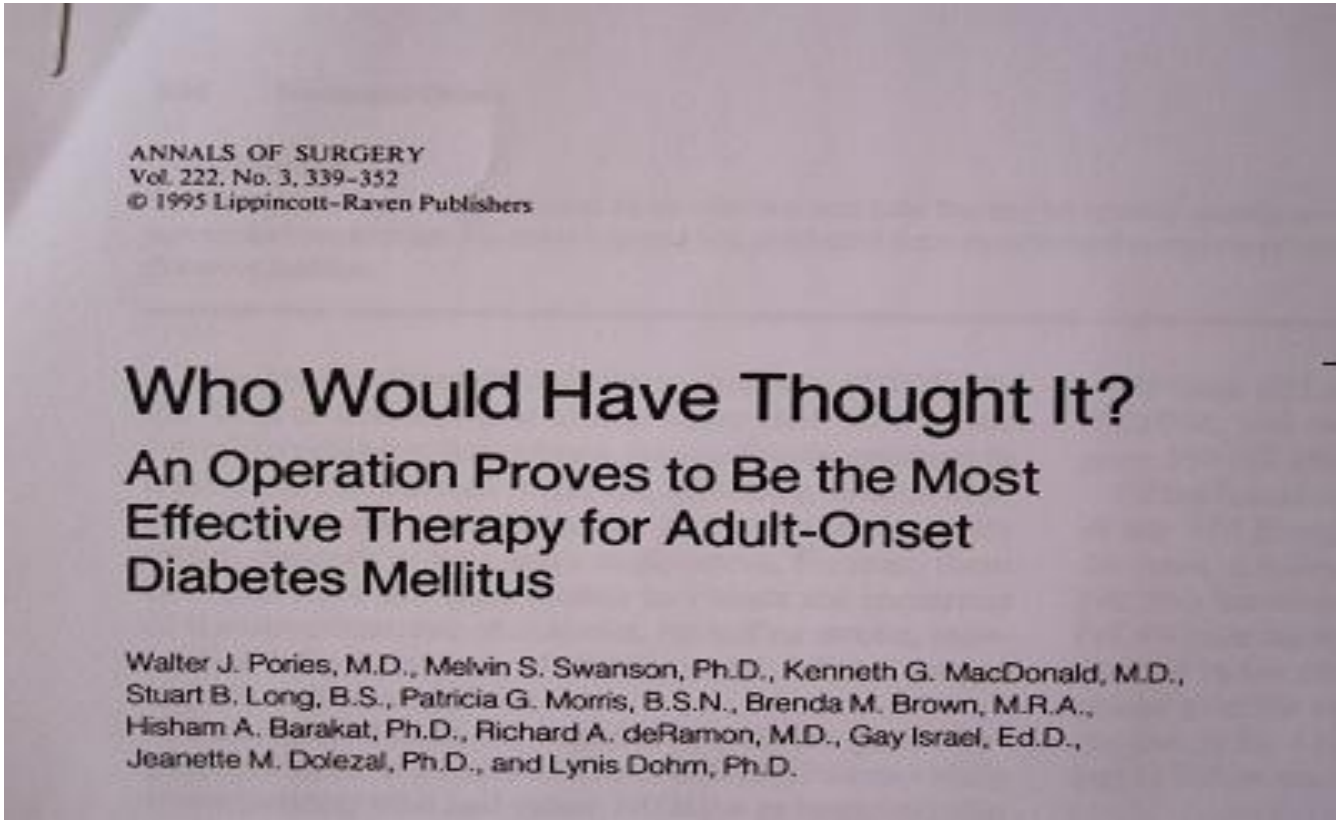
- *No!*
- But it’s a very good solution for the selected few!

Weight loss is pivotal in preventing diabetes

The physician should take pride in the prevention of diabetes in his practice. Obese patients should be frankly told that they are canidates for diabetes.

Joslin EP. The prevention of diabetes mellitus. *The Journal of the American Medical Association* 1921;76:79-84.

Bariatric surgery on stage



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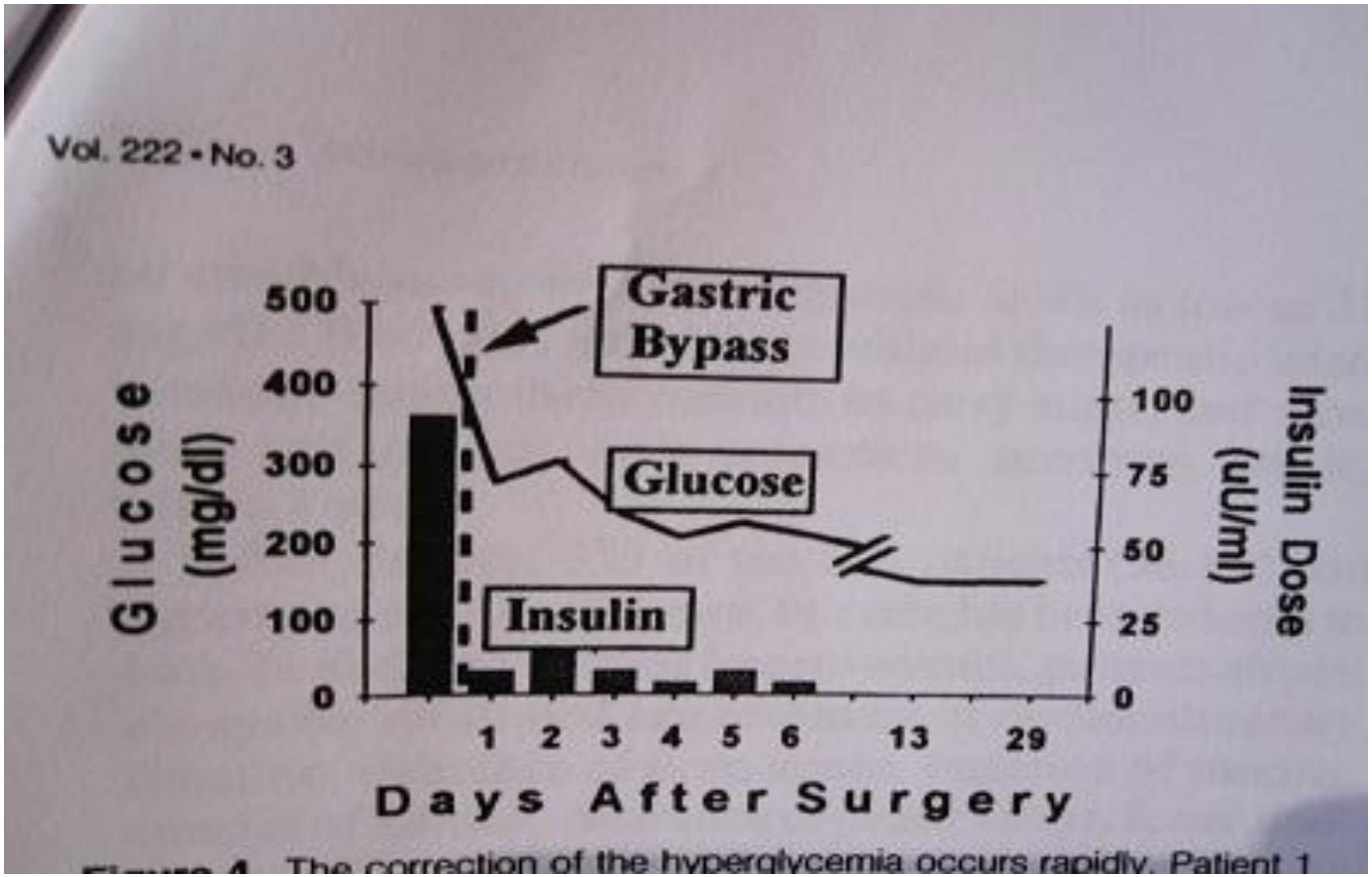
Who Would Have Thought It?

An Operation Proves to Be the Most Effective Therapy for Adult-Onset Diabetes Mellitus

Walter J. Pories, M.D., Melvin S. Swanson, Ph.D., Kenneth G. MacDonald, M.D., Stuart B. Long, B.S., Patricia G. Morris, B.S.N., Brenda M. Brown, M.R.A., Hisham A. Barakat, Ph.D., Richard A. deRamon, M.D., Gay Israel, Ed.D., Jeanette M. Dolezal, Ph.D., and Lynis Dohm, Ph.D.

An interesting observation!



Swedish Obese Subjects

- Observational epidemiology indicates that from a mortality point of view it is dangerous to be obese, to increase and also to decrease in body weight

- Enigmatic, since weight loss improves cardiovascular risk factors and semistarvation prolonges life span, at least in animals

Swedish Obese Subjects

- Prospective, controlled, long term, non-randomised clinical trial
- Bariatric surgery *vs.* conventional treatment
- 37-60 years
- BMI $\geq$ 34 kg/m^2 (men), $\geq$ 38 kg/m^2 (women)
- Total mortality hard end point

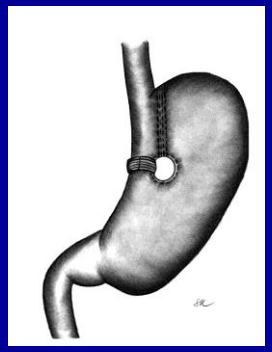
Swedish Obese Subjects

	Surgery	*Conventional*
n	2010	2037
Women (%)	70,7	70,3
Age (y)	47,4	48,8
BMI (kg/m^2)	42,3	40,0

Swedish Obese Subjects

VBG, vertical banded gastroplasty

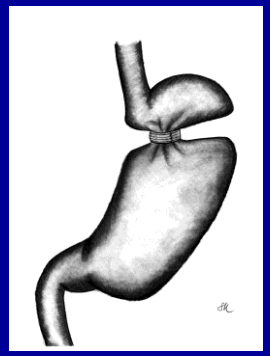
68%



SOS: L. Sjöström and S. Carlsson ©

Gastric banding

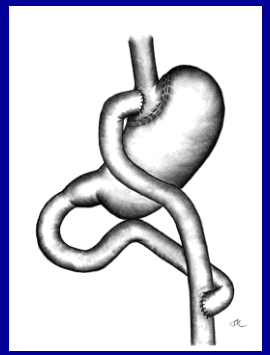
19%



SOS: L. Sjöström and S. Carlsson ©

Gastric bypass

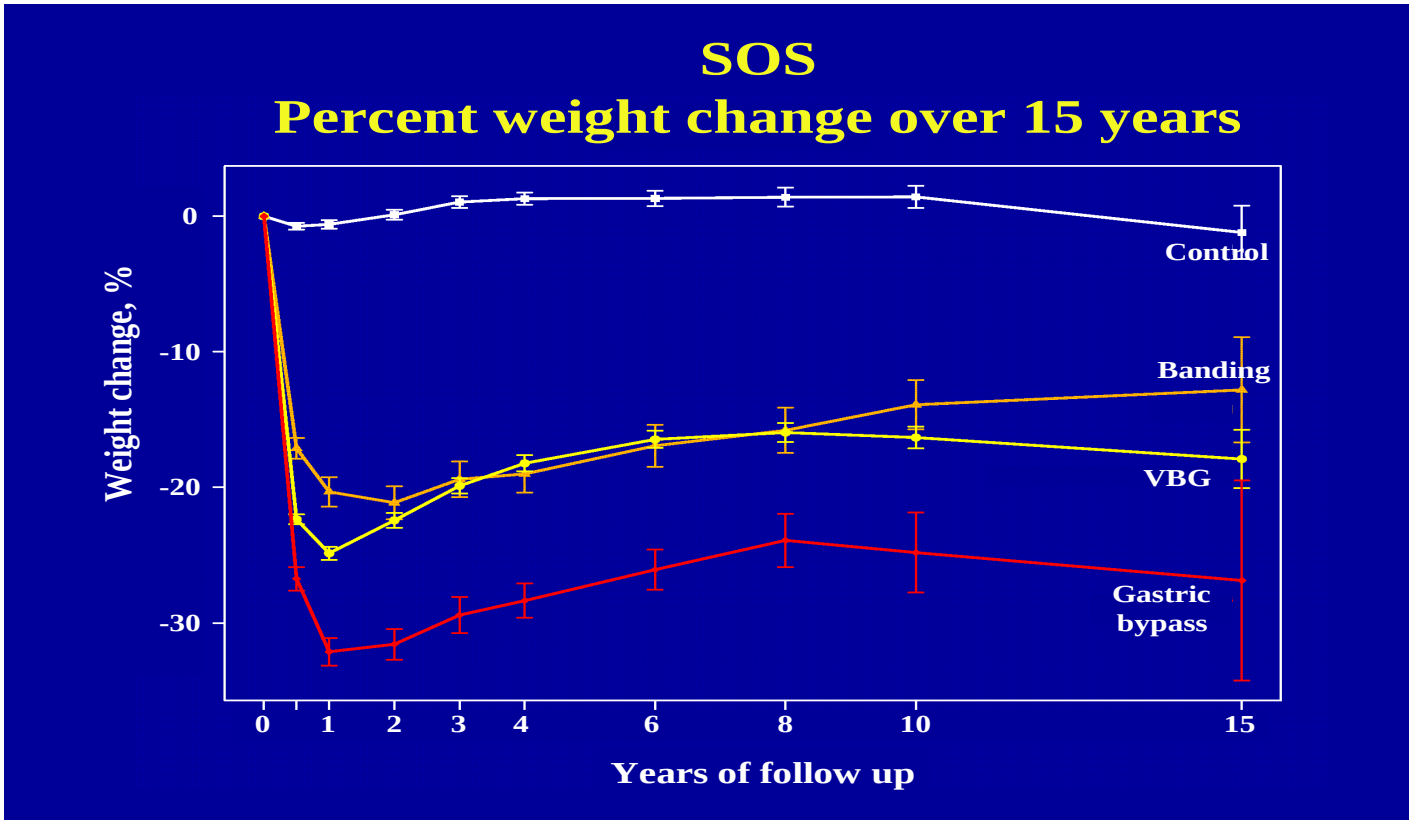
13%



SOS: L. Sjöström and S. Carlsson ©

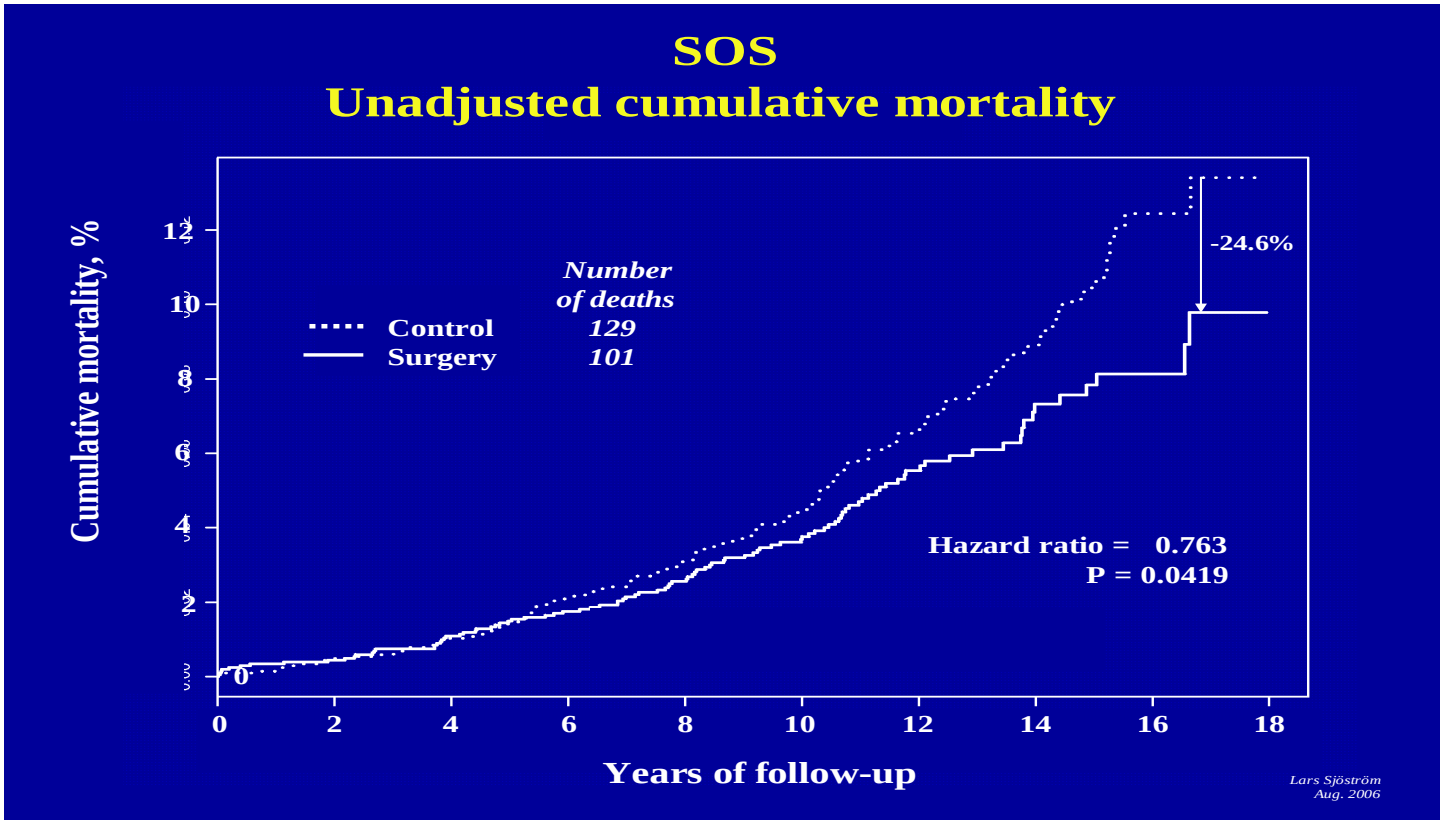
VÄSTRA GÖTALANDSREGIONEN

Swedish Obese Subjects



Sjöström L et al. *N Engl J Med* 2007;357:741-52.

Swedish Obese Subjects



Sjöström L et al. *N Engl J Med* 2007;357:741-52.

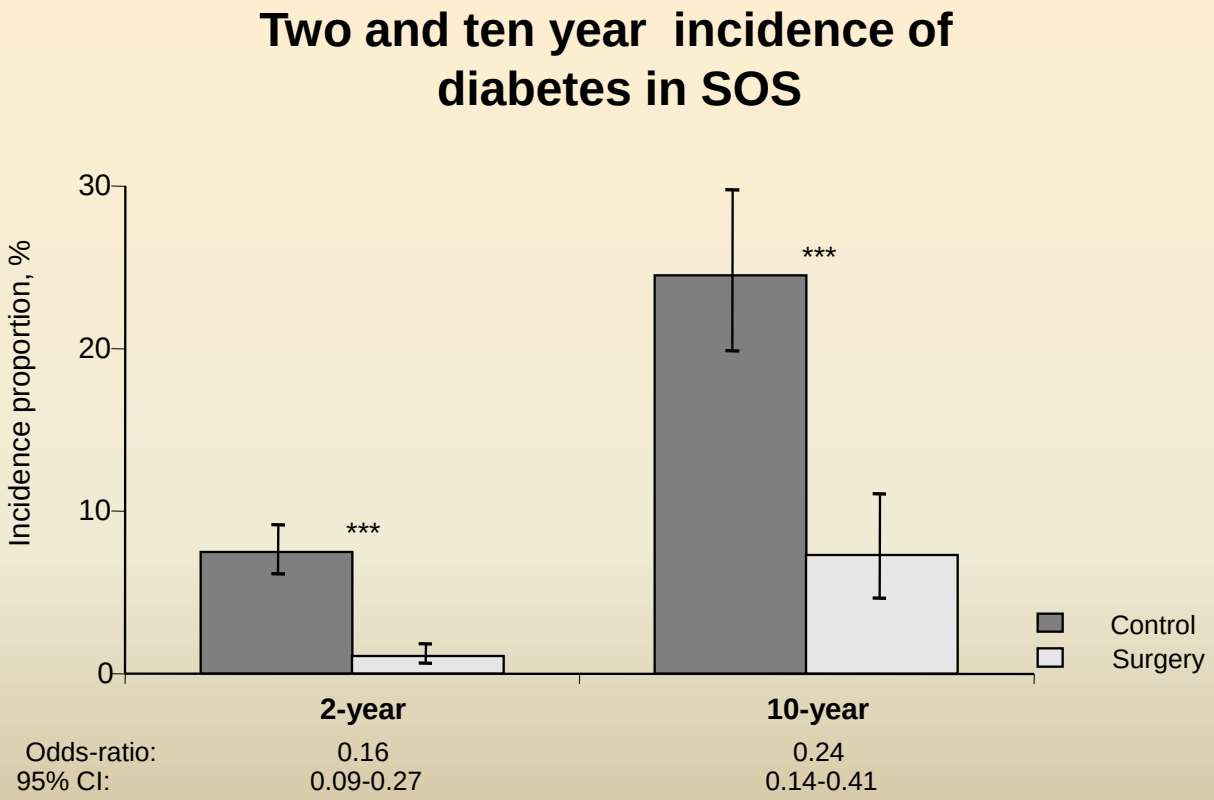
Swedish Obese Subjects

Peroperative mortality (< 90 days from operation/inclusion)

5 in 2010 operated	(0,25%)
2 in 2037 conventionally treated	(0,10%)

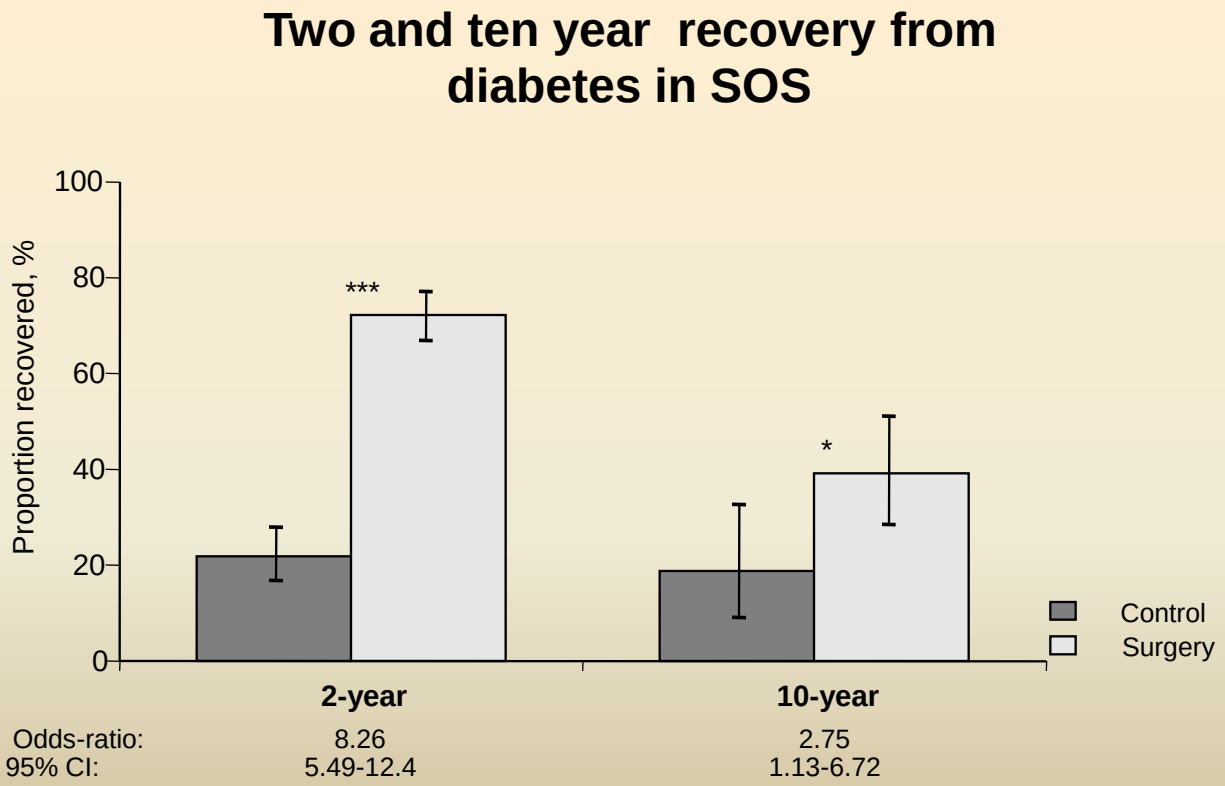
Swedish Obese Subjects

Sjöström L et al. *N Engl J Med* 2004;351:2683-93.



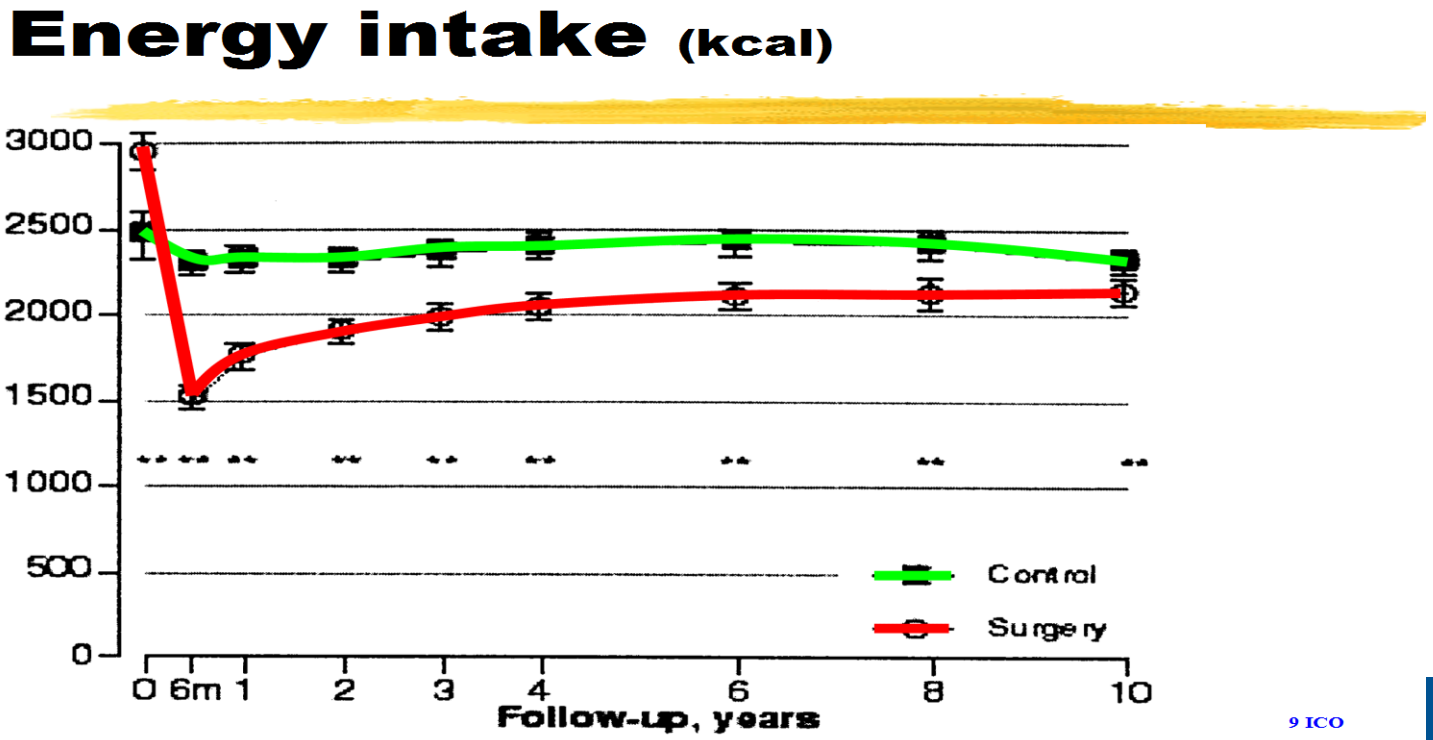
Swedish Obese Subjects

Sjöström L et al. *N Engl J Med* 2004;351:2683-93.

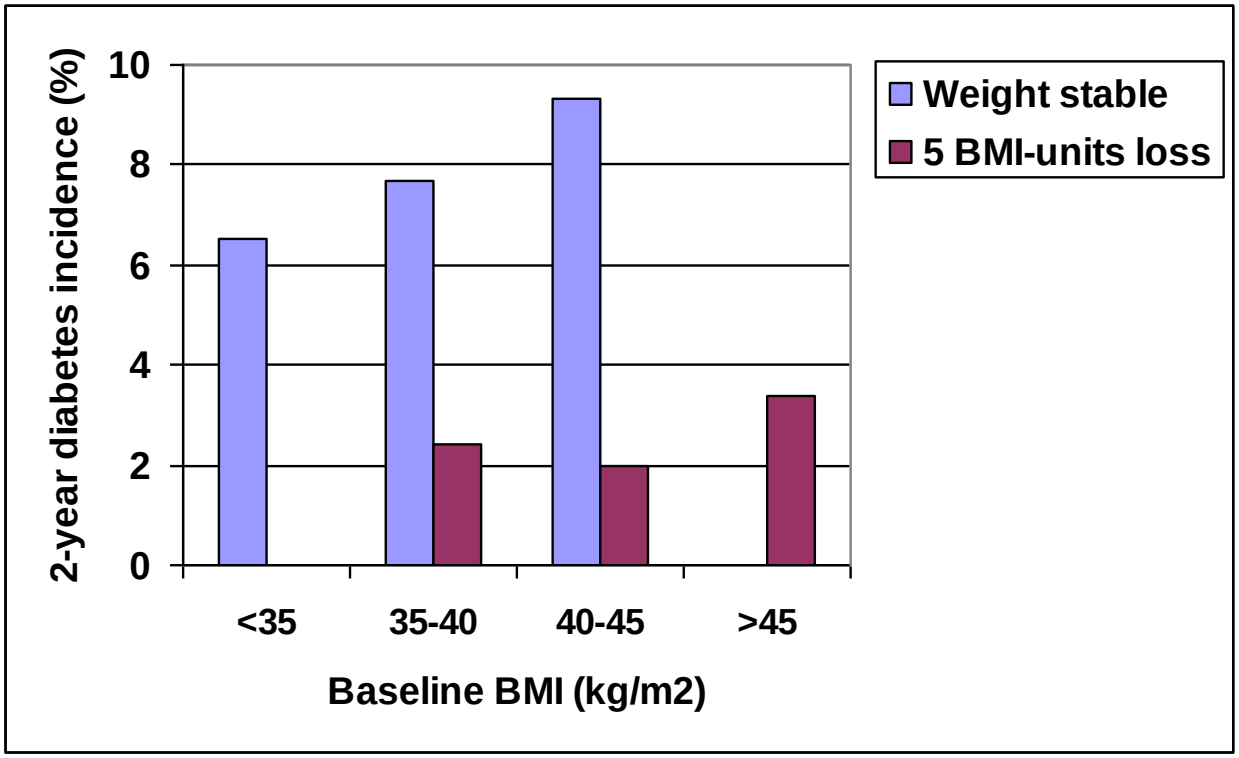


Why does surgery work?

1) Reduced energy intake and weight loss (SOS study) increase insulin sensitivity



Why does surgery work?



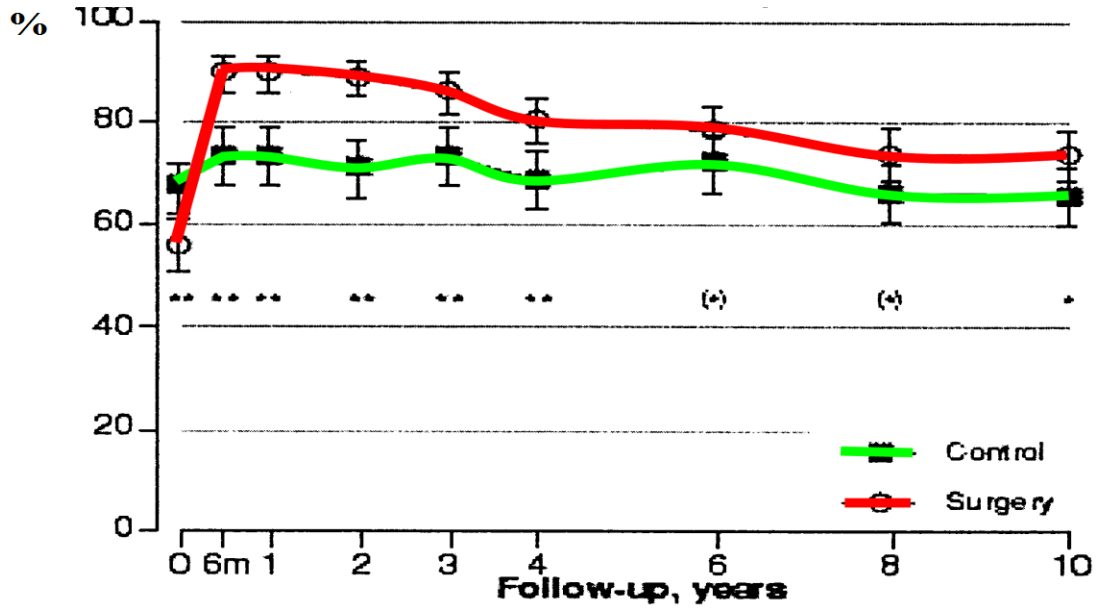
Weight loss more important than overweight per se (SOS study)

SOS-study, unpublished data

Why does surgery work?

2) Increased physical activity (SOS study) increases insulin sensitivity

Physical activity, leisure time



Why does surgery work?

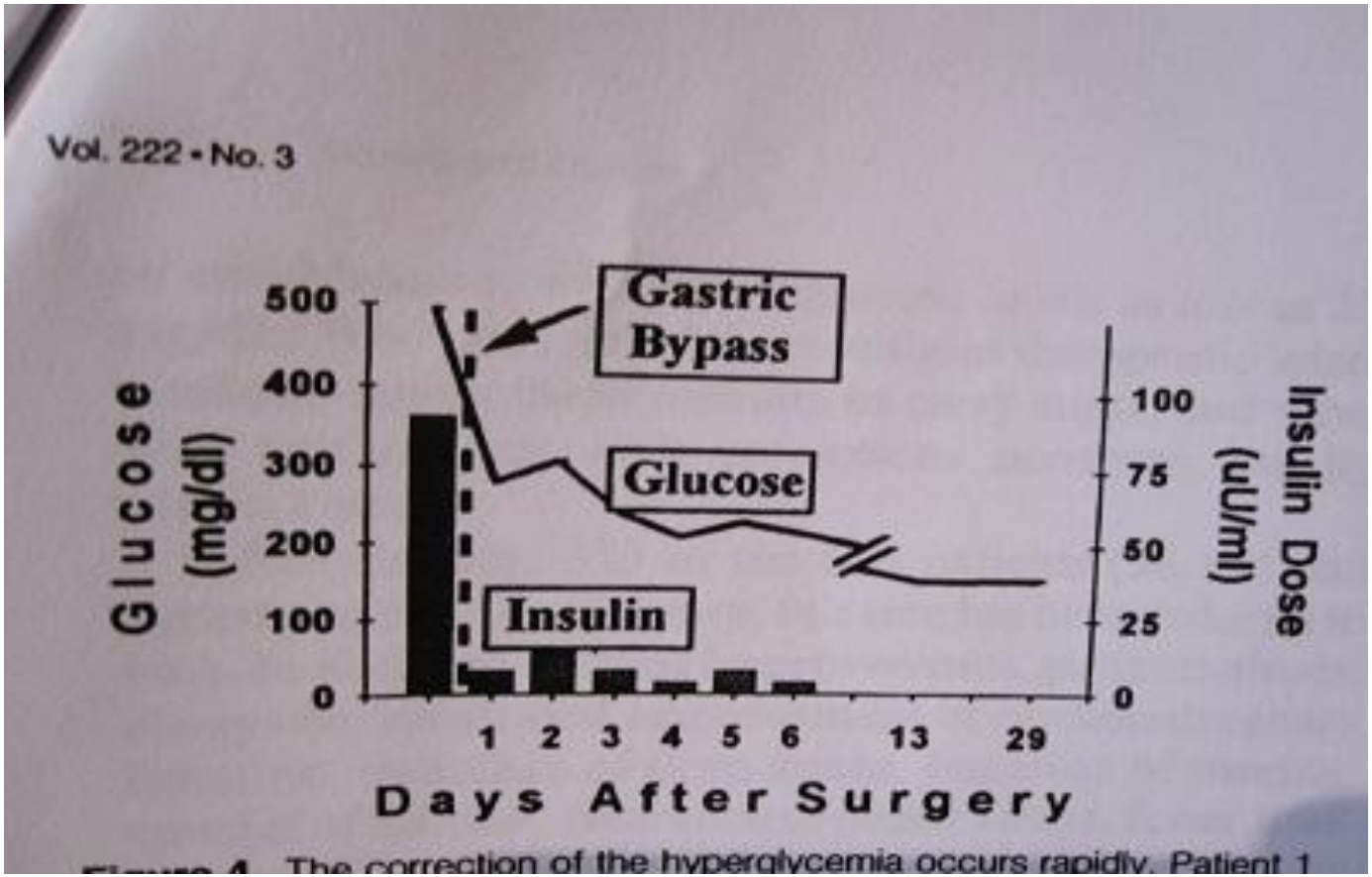


Figure 4. The correction of the hyperglycemia occurs rapidly. Patient 1

Must be more than weight loss!

Why does surgery work?

3) Increased insulin sensitivity/decreased appetite due to decreased *ghrelin* secretion (Roux-en-Y gastric bypass)

4) Cytokines and inflammatory factors decrease (*leptin, IL-6, TNF, CRP*) or increase (*adiponectin*) after Roux-en-Y gastric bypass, leading to improved insulin sensitivity

Why does surgery work?

5) Triglycerides stored outside of adipocytes i.e. *ectopic lipids* interfere with insulin signalling and increase insulin resistance in muscle/liver (Roux-en-Y gastric bypass)

6) Increased *GLP-1* secreation increases insulin secretion and improves insulin sensitivity (Roux-en-Y gastric bypass)

Why does surgery work?

7) PYY secretion is increased following Roux-en-Y gastric bypass, which improves insulin sensitivity

Conclusion

- Bariatric surgery reduces diabetes incidence
- Several other possible mechanisms than just weight loss
- Different surgical approaches have different impact

Conclusion

- Beneficial for the individual obese patient
- Limitid public health effects
- Thus not the final solution!