

Liposuction and Metabolism
Does the body change after Liposuction?
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- ◆ **Introduction**
- ◆ **Materials and Methods**
- ◆ **Results**
- ◆ **Discussion**
- ◆ **Conclusion**

Maximum Fat Aspirate Volumes
1980
1985
1990
1995
 1,500 cc
 2,000 cc
 4,000 cc
22,000 cc

Fat Cell Number
◆ **Born with 5×10^9 cells**

◆ **Adult with 5×10^{10} cells**

Total Fat Cells Removed

5-50% ?

An Enlarging Total Fat Mass Increases

- ◆ **Sympathetic activity**
- ◆ **Metabolic rates**
- ◆ **Fat cell lipolysis**
- ◆ **Free fatty acid flux in hepatic circulation**
- ◆ **Pancreatic insulin secretion**
- ◆ **Insulin resistance**
- ◆ **Hepatic synthesis of VLDL, TG, ApoB**
- ◆ **Hepatic TG lipase**

- ◆ **Serum TG**

- ◆Cholesterol ester to
adipose tissue
- ◆Vasoconstriction
- ◆Cardiac output
- ◆Renal Na reabsorption
- ◆Blood pressure
- ◆Aromatization of
steroids
- ◆Free testosterone

An Enlarging Total Fat Mass Decreases

- ◆Hepatic glucose uptake
- ◆Skeletal muscle glucose
uptake
- ◆Insulin antilipolytic
effect

- ◆Hepatic insulin extraction
- ◆SHgb
- ◆Serum HDL

Footnote: Fat Distribution, 1987 Claude Bouchard

Surgical Removal of Fat

- ◆May affect feeding behavior
- ◆May affect glucose insulin
metabolism
- ◆May affect weight

**Will the removal
of fat cells affect
any metabolic system?**

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Patient Selection

- ◆19 consecutive hospital-based
patients scheduled for
liposuction.
- ◆2 patients had the procedure
twice.

Measured Data

- ◆ **Changes in serum lipids**
- ◆ **Changes in weight and BMI**
- ◆ **Changes in exercise habits**
- ◆ **Changes in dietary habits**

Pre- Postoperative Interval Range

Mean

10-40 weeks

27 weeks

Serum Lipid Test

- ◆ **8 hours NPO**
- ◆ **Olympus AU 5000**
- ◆ **Photospectrometry**

Serum Lipid

- ◆ **Total Cholesterol**
- ◆ **LDL Cholesterol**
- ◆ **HDL Cholesterol**
- ◆ **Triglycerides**
- ◆ **Cholesterol/HDL ratio**

Patient Profile

Nutritional Counseling

- ◆ **All patients received nutritional counseling postop by a licensed dietitian.**
- ◆ **At-risk patients received a full assessment with recommendations and educational materials.**

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Results

19 consecutive patients

Hospital based

General anesthesia

Tumescent technique

- ◆ Exercise 7 improved
 2 digressed
 10 unchanged

◆ Conclusion

Suggestions For Study

- ◆ Larger study
- ◆ More specific patient selection
- ◆ Account for dietary, weight, and exercise changes
- ◆ Sequential serum studies
- ◆ Measure for fat necrosis

Total Fat Cell

- ◆ 30% may be very small diameter
- ◆ Represents <1% of total fat volume
- ◆ May be recruitment after existing large cells have reached a critical size
- ◆ Site-to-site variation in cell size
- ◆ Adiposity is a function of hypertrophy

“LIPOSTAT”

-- more related to individual fat cell size, not total fat mass

Exercise

- ◆ Increased HDL cholesterol
- ◆ Easier to diet

Effects of

FAT NECROSIS

on lipid metabolism

May need to evaluate weight changes with large volume liposuction

Effects of

EXERCISE

on lipid metabolism

Effects of

DIET

on lipid metabolism

Diet

- ◆Decreased LDL and total cholesterol
- ◆Decreased triglyceride
- ◆Increased HDL

Fat Necrosis

- ◆Increased triglyceride

Conclusion

OBESITY

- ◆Higher serum triglycerides, total and LDL cholesterol
- ◆Lower HDL cholesterol
- ◆Higher blood pressure
- ◆Glucose/insulin metabolism disturbances
- ◆Increased cancer and mortality risks

Excess Calories

- ◆70% of excess calories are stored as fat
- ◆Connected to free fatty acids in the liver
- ◆Stored as triglyceride in fat cells

Lipids

- ◆Cholesterol
- ◆Triglycerides
- ◆Phospholipids
- ◆Free fatty acids

FAT CELL

- ◆3-10 x 10¹⁰ total body cells
- ◆Storage .001 - 1 ug of triglycerides
- ◆Can increase 1000 x in volume
- ◆Can increase 100 x in surface
- ◆95% triglyceride