



HIGH SUPERIOR TENSION ABDOMINOPLASTY

Thesis

Submitted for partial fulfillment of master degree in general surgery

By

Islam Reda El Gawish

M.B.B.C.H Faculty of Medicine Ain shams University

Under Supervision of

Prof. Dr. Tarek el Bahar

Professor of general surgery
Faculty of Medicine Ain shams University

Assist. Prof. Dr. Ahmad El Sherif

Assistant Professor of plastic and reconstructive surgery
Faculty of Medicine Ain shams University.

Faculty of Medicine

Ain Shams University

2018

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

لَسْبَدَّ اُنْكَ لَا نَعْلَمُ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدق الله العظيم

سورة البقرة الآية: ٢٢



First and foremost, all thanks and gratitude to *Allah*, the Most Merciful, who gives us the power to accomplish this work.

I would like to express my deepest gratitude and cordial appreciation to *Prof. Dr. Tarek el Bahar*; Professor of general surgery Faculty of Medicine Ain shams University, for his expert advices and meticulous guidance and support throughout this work.

I feel deeply indebted to *Assist. Prof. Dr. Ahmad El Sherif*; Assistant Professor of plastic and reconstructive surgery, Faculty of Medicine Ain shams University, who gave me much of the efforts, time, experience and close supervision throughout the work. They provided me with continuous encouragement and assistance throughout this work.

I'm also deeply grateful for *all patients* included in this study for being cooperative.

✍ *Islam El Gawish*

LIST OF CONTENTS

Title	Page No.
List of Contents	I
List of Abbreviations	II
List of Tables	III
List of Figures.....	IV
Introduction	1
Aim of the Work.....	10
Review of Literature	11
➤ Anatomy of the Anterior Abdominal Wall.....	11
➤ Aesthetic Of The Abdomen	25
➤ ABDOMINOPLASTY	33
➤ Standard Technique Of Abdominoplasty.....	39
➤ The High-Superior-Tension Technique	50
➤ Abdominoplasty Complication & Mangement.....	63
Patients and Methods	78
RESULTS	94
DISCUSSION	100
Conclusion	106
Summary	Error! Bookmark not defined.
References	107
المخلص العربى.....	1

LIST OF ABBREVIATIONS

Abb.	Full Term
ALP	: Alkaline phosphatase

LIST OF TABLES

Table No.	Title	Page No.
Table (1):	Difference between male and female characteristics of the abdomen	32
Table (2):	Perioperative measures that aid in decreasing the incidence of DVT/PE.....	76
Table (3):	The scoring system for assessment of the aesthetic result	91
Table (4):	Classification of abdominoplasty complications into major and minor ones.	93
Table (5):	Postoperative follow up statistical comparative statistical data included as regards follow up period (in weeks), total amount of drain in (ml), drain removal (in days),Hb percentage in (gm\dl) post operatively and patient satisfaction (early & late) Early: within 2 weeks, Late: 4 to 5 weeks	95

LIST OF FIGURES

Figure No.	Title	Page No.
Figure (1):	Sophisticated structures of the abdominal panniculus. Photo (a) after liposuction procedure on a cadaver showing: skin (S), areolar layer (AL), fascia superficialis (F), communicating vessels (C), perforator vessels (P), lamellar layer (LL), and rectus abdominis muscle (RAM).Drawing (b) showing the same structures	4
Figure (2):	Boundaries and layers of the abdominal wall.	12
Figure (3):	Fascial zones of adherence.....	13
Figure (4):	Muscles of the anterolateral abdominal wall.....	15
Figure (5):	The abdominal wall receives its blood supply from direct cutaneous vessels and musculocutaneous perforating vessel.....	16
Figure (6):	Arterial supply and innervation of the anterior abdominal wall	20
Figure (7):	Zones of blood supply to the abdominal wall.	21
Figure (8):	Venous drainage and cutaneous innervation of the abdominal wall.....	22
Figure (9):	Veins and lymphatics of the anterior abdominal wall	23
Figure (10):	Dermatomes and distribution of cutaneous nerves on the anterior abdominal wall	24
Figure (11):	The seven aesthetic units of female abdomen.	26
Figure (12):	The six aesthetic units of male abdomen	27
Figure (13):	The youthful umbilicus is often vertically oval or elliptical in orientation.	28
Figure (14):	The ideal appearance of a torso.....	31
Figure (15):	Abdominoplasty : System of Classification and treatment for abdominal contour surgery.....	33
Figure (16):	Algorithm for selecting best abdominoplasty procedure for a patient based on degree of excess skin, lipodystrophy, muscle laxity, and location.	34
Figure (17):	Preoperative marking of abdominoplasty incision.....	40
Figure (18):	Surgical markings are made confining the incisions to reasonable undergarments (paired hashmarks at either side of skin fold). The black line ellipse is marked for excision	41
Figure (19):	Preoperative preparation	42
Figure (20):	Umbilicus is vertically incised.....	43
Figure (21):	Once the umbilicus has been incised and dissected free, the lower abdominal flap is incised longitudinally	43
Figure (22):	(A), The dissection continues to the costal margins, using electrocautery to seal all perforating vessels. (B), Inferior dissection is also performed, elevating the soft tissue to the level of the symphysis pubis.....	44
Figure (23):	(A, B) Markings are made to identify the medial border of the rectus diastasis and to delineate the second plication layer. (C, D and E) The strong muscle plication can be performed in a single	

line or two lines of closure tailored to the patient's abdominal wall laxity.....	45
Figure (24): (A–G) Tissue demarcation is done with the patient flexed at the waist in a modest jack-knife position.....	47
Figure (25): Closure of the abdomen after skin resection	49
Figure (26): (A–C): The epigastric pinch test. A, Candidate patient B, The excess epigastric skin is pinched. C, Fingers are separated to measure the skin excess. Eight cm between the 2 fingers is the minimal amount of distance to avoid the vertical suprapubic scar	52
Figure (27): (A, B): A, Liposuction (in the hypogastrium: deep and laterally) and in the epigastrium: deep and superficial). No liposuction is performed below the umbilicus in the hypogastrium. B, Dissection in the iliac fossa performed at the upper part of the liposuctioned tissues, visible here on the scissors.....	55
Figure (28): (A,B): A, Epigastric dissection staying deep on the muscular fascia to avoid damage to any part of the axillary lymphatic trunk. B, Aponeurotic plication at the maximum point between the lowest costal arch and the iliac crest is done.....	57
Figure (29): (A, B): A, the new umbilical site; note heart-shaped deepithelialization, two high-tension sutures and the gap between the new umbilicus and the umbilical stalk. B, High tension is applied in the epigastrium, medium tension in the hypogastrium, and nearly no tension on the lowest part of the abdominal flap	58
Figure (30): In executing the high superior tension technique, 2 traction sutures placed at 3- and 9-o'clock positions bite the paraumbilical aponeurosis and the dermis of the upper part of the new umbilicus	59
Figure (31): (A, B): A, Preoperative view of a 40-year-old woman. B, Postoperative view 2 years after high superior tension abdominoplasty and lipoplasty of the hips and saddle bags.....	62
Figure (32): Progressive tension suture placement	66
Figure (33): Necrosis of the abdominal flap	68
Figure (34): Sever cellulitis and debridment.....	72
Figure (35): this chart demonstrates percentage of patient satisfaction	96
Figure (36): Case No.1	97
Figure (37): Case No.2	98
Figure (38): Case No.3.....	99

ABSTRACT

Abdominoplasty is among the most popular procedures in esthetic surgery generating high levels of patient satisfaction. It is, nevertheless, associated with a significant incidence of complications. These, however, do not seem to negatively affect patient satisfaction.

Traditional abdominal contouring surgery has been limited to the standard abdominoplasty performed through a variety of surgical incisions and with minimal variations in technique for long period. It is usually associated with a relatively high complication rate because of the large scale undermining required. It also involves the rupturing of the lymphatic and neurovascular supply to the abdominal flap.

INTRODUCTION

According to Grazer and Goldwyn and later Guerrerosantos et al., complications after abdominoplasty were a constant problem among plastic surgeons. With the combination of traditional abdominoplasty and a liposuction technique, the complications became even more frequent, as reported by Goldwyn a few years after liposuction was introduced and popularized by Illouz. (**J. M. Avelar ,2016**)

In my judgment the complications were related to vascular damage during surgery, and as there was no adequate solution for the problems I then made the decision of not performing such combined operations anymore . Of note, Hetter et al., Dellerud , and later Flageul et al. reported that seroma formation, hematoma, sloughing of the skin, minor and major areas of panniculus necrosis of the abdominal wall, thromboembolism, and unesthetic scars around the umbilicus were some of the most frequent complications after abdominoplasty. (**J. M. Avelar ,2016**)

Since the earlier period of the practice, these kinds of complications concerned me so much that I was motivated to study and research the anatomy of the abdominal panniculus, searching for a new method in order to avoid these complications. In 2006, Matarasso et al. reported the findings of the American Society for Aesthetic Plastic Surgery's 2004 Cosmetic National Data Bank: during the previous 7 years, the number of

abdominoplasty operations performed had increased by 344%. This is important information; due to safety procedures, surgical results have improved, with minimal rates of complications, encouraging plastic surgeons to perform abdominoplasties. (**J. M. Avelar ,2016**)

During that period of introduction, learning, practising, and teaching the liposuction technique, several questions about it came to mind:

1. The limit of the patient's age for undergoing liposuction
2. The limit of fat tissue to be removed in each operation
3. Criteria of indications for overweight patients
4. The anatomy of the panniculus
5. The clinical and metabolic alterations after liposuction
6. Redundancy of the skin secondary to the liposuction procedure
7. Liposuction combined with traditional procedures
8. Behavior of the remaining fat tissue after surgery.

The first three questions mentioned above led to the establishment of adequate rules and criteria for plastic surgeons; these have been useful from that period to the present. However, regarding the anatomy of the panniculus, I devoted much time to research in cadavers in order to know fat tissue, as well as its

distribution in all regions of the human body. That knowledge was a good support at that time, providing proper conditions to employ the new technique of liposuction. Even nowadays that anatomical information is still very useful when fat-suction is done. (**J. M. Avelar ,2016**)

To solve the problem concerning redundancy of the skin after the liposuction procedure, it became mandatory to remove such skin in order to achieve a good balance of the regions with harmony in body contouring. In fact, the traditional abdominoplasty described by Callia and popularized by Pitanguy used to be the fundamental procedure for combination with the liposuction technique developed by Illouz. However, when such a combined procedure was performed on the abdomen, several kinds of local complications were seen quite often: seroma formation, hematoma, cutaneous sloughing, and skin and panniculus necrosis. (**J. M. Avelar ,2016**)

The behavior of the remaining fat tissue after liposuction, the selection of patients, and the indications for liposuction are meticulously emphasized. It is described that the fibrotic and thick tissue developed secondarily to fat-suction is very difficult to dissect and to undermine, and even makes it difficult to move the panniculus for resection. It is mentioned that in cases of a secondary liposuction on the abdominal wall, the procedure must be done carefully, since the cannula may accidentally perforate the

muscular structures, causing severe damage to the internal organs.
(J. M. Avelar ,2016)

Besides these situations, several other problems used to occur during and after liposuction procedures. Bleeding during operation was a frequent problem, requiring transfusion of donated or autologous blood. Nowadays, most of these problems have been adequately solved. But during that time it was my obsessive pursuit to learn widely and very broadly about these problems. Nevertheless, performing liposuction on the abdominal wall used to be even more complex than previously, since physical abnormalities as well as expectations of the results were a constant challenge. (J. M. Avelar ,2016).

During a long period of anatomical studies and analyzing the complications of conventional abdominoplasty, I concluded that most of the problems were caused by venous and lymphatic stasis, due to the cutting of the perforator vessels (Fig. 1).

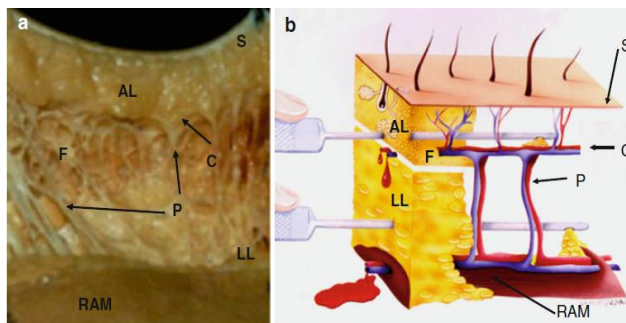


Figure (1):Sophisticated structures of the abdominal panniculus. Photo (a) after liposuction procedure on a cadaver showing: skin (S), areolar layer (AL), fascia superficialis (F), communicating vessels (C), perforator vessels (P), lamellar layer (LL), and rectus abdominis muscle (RAM).Drawing (b) showing the same structures

However, after the liposuction procedure the perforator vessels coming from the rectus abdominalis to the remaining panniculus were preserved, as demonstrated in some slides that Prof. Callia gave me. He had performed conventional abdominoplasty in a group of female patients 6 months after liposuction because of their complaints about the redundant skin. I analyzed his slides in comparison with mine, taken from my previous anatomical research in cadavers, and came to the conclusion that it would be possible to perform panniculus resection combined with liposuction as long as the perforator vessels coming from the rectus abdominalis would be preserved. That is the basis of my new concepts, which I pursued in order to perform abdominoplasty safely. (**J. M. Avelar ,2016**)

Due to my conclusion, I was motivated to perform, on cadavers, full-thickness suction of the subcutaneous tissue in an elliptical area on the suprapubic region and on the medial thigh. Afterwards skin resection was done and I identified structures similar to those I had found on cadavers after liposuction procedures in my previous anatomical research, which was a fundamental support of information . (**J. M. Avelar ,2016**).

Later, liposuction was done below the fascia superficialis that is underneath the areolar layer of the panniculus which is moved from one border to another to facilitate the suture of the surgical

wound. At that moment I was sure that such an operation could be performed safely without any bleeding during or after surgery.

It was clear to me that a new procedure could be performed, with minimal complications, in order to suction the accumulated fat, combined with skin resection of the redundant cutaneous covering after the fat-suction. In my original publications this method was employed for treatment of the abdominal wall, medial thigh lifting, flanks, and axilla, as well as in a closed vascular system, since no vessels are damaged.

Therefore, the final conclusions were to treat not only the abdominal wall, since the whole body may present localized adiposities and redundant skin as well. Due to my anatomical investigations, several segments of the human body were adequately repaired with minimal complications using the same surgical principles, which are to preserve the perforator vessels to work as multiple pedicles for the abdominal wall, medial thigh, flanks, and torso, as well as in the axillary regions. I have also employed similar surgical principles to perform face lifting, ear reconstruction, and reverse lower blepharoplasty, and to treat other segments of the human body. Also I perform rhytidoplasty with reduced cutaneous undermining by tunnelization preserving the perforator vessels to assure adequate blood supply. My technique for ear reconstruction involves the same surgical principles as those described for abdominoplasty.