

# COMPARATIVE STUDY BETWEEN FLEUR-DE-LIS AND TRADITIONAL ABDOMINOPLASTY IN POST WEIGHT LOSS PATIENTS

By

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## ABSTRACT

**Background:** Many patients are seeking body contouring surgery after massive weight loss as they have skin redundancy. So, skin resection via abdominoplasty can help to improve skin quality and eliminate the redundancy. This type of patients may need more than one surgical touch; i.e. combined surgeries.

**Objective:** To evaluate the results of Fleur De Lis and Traditional techniques in post massive weight loss patients; objective and subjective evaluation.

**Patients and Methods:** This prospective study included 30 patients of massive weight loss who attended to Al-Azhar University Hospitals, Cairo (Al-Hussein Hospital, and Sayed Galal Hospital) during the period from Jan 2020 to June 2021. They were divided into two equal groups: Group “A” was done by Flue De Lis technique, and group “B” was done by the traditional technique, and compared the results of both techniques.

**Results:** The magnitude of Fleur De Lis technique over traditional technique in post bariatric patients was a safe procedure, and giving an excellent result in body contouring to improve the quality of life, social and physical activities, and sexual performance.

**Conclusion:** Fleur De Lis abdominoplasty was a good option for post bariatric female patients with upper skin laxity who were seeking exaggerated waist circumference and feminine waist hip ratio (WHR).

**Keywords:** Abdominoplasty in post massive weight loss, Fleur De Lis abdominoplasty, Traditional Abdominoplasty.

## INTRODUCTION

Body contouring surgery after massive weight loss remains a fast-growing field due to the rising number of post bariatric surgery patients, and it can improve patients' quality of life substantially (*Martin et al., 2017*).

There is strong evidence that beautiful people have essential advantages in life. People with an attractive outer appearance can find sexual partners more easily, get

better paid jobs, and are of better health. Thus, a slim waistline represents health and discipline (*Papadopulos et al., 2019*).

The goal of contour surgery is abdominal aesthetic improvement of the affected soft tissue layers of skin, fat and muscles through the least conspicuous incision feasible. Depending on the anatomic nature of the disagreeable biologic condition, the goal can be achieved through a range of procedures

referred to as the abdominoplasty classification (*Matarasso et al., 2014*).

Massive weight loss, post bariatric patients will often have redundant skin and subcutaneous tissue in both the horizontal and vertical vectors. Traditional abdominoplasty may fail to adequately correct the horizontal laxity in these patients. To correct these difficult abdominal contour cases, we offer patients abdominoplasty with a fleur-de-lis vertical excisional component (*Freidman and Wiser, 2019*).

Standard abdominoplasty enables excision of excess tissue in one plane only through a single transverse incision. The single incision may be inadequate in addressing excessive tissue. The Fleur De Lis technique removes supraumbilical horizontal excess via a vertical excision, in addition to the transverse incision (*Siva and Sambasiva, 2013*).

Dellon was the first one to popularize the Fleur De Lis technique in 1985. He used this technique in patients who had marked weight loss, abdominal panniculus with obesity or supra umbilical dermatochalasis. It is therefore an ideal technique for massive weight loss patients. A similar operative technique was described as early as 1967 by Castanares and Goethel. Thus, the operation derived its name from the first stitch bringing the flaps together, giving the appearance of a fleur de lis pattern (*Friedman et al., 2010*).

#### PATIENTS AND METHODS

This was a prospective Cohort study which included 30 patients of massive weight loss who attended to Al-Azhar University Hospitals, Cairo (Al-Hussein

Hospital, and Sayed Galal Hospital) during the period between Jan 2020 and June 2021. They were divided into two equal groups in randomized pattern: Group "A" was done by Flue-De-Lis technique, and group "B" was done by the traditional technique, and compared the results of both techniques.

Comparison between both groups as regard objective evaluation; sex, waist hip ratio (WHR), operative time, hospital stay, ICU stay, rehabilitation time, blood transfusion and complications and subjective evaluation; surgeon satisfaction, self-image, social and physical activity, psychological impact and sexual performance.

After we got approval of the local ethical committee, a file of data for each patient was created; containing a detailed informed consent about the procedure, possible complications, being involved in this study and photography pre, intra and post-operative. Also, containing pre and post-operative questionnaire and case follow up sheet about anthropometric measures and full labs.

All patients are of both sexes and age range between 25 years to 55 years, with massive weight loss of 20-50 kg either by lifestyle modification or bariatric surgery, with maximum BMI 30 kg/m<sup>2</sup> with weight stabilization for at least 6 months. Patients with major or chronic illness were excluded. Also, patient with unrealistic expectation is not included in our study.

**Preoperative evaluation:** was done through complete history taking, general examination and other specialties consultation if needed. Local examination in both erect and supine positions with anthropometric measure to determine the

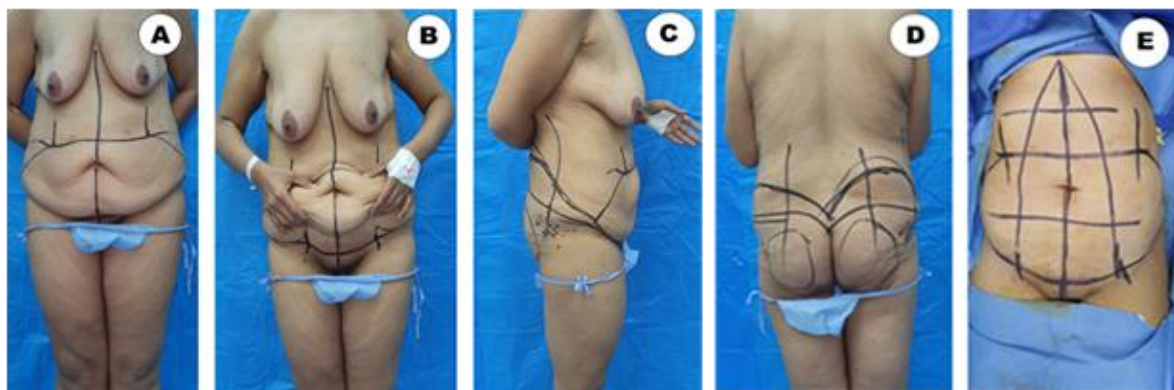
problem and choose the proper technique. Also, routine laboratory investigations (CBC, kidney function tests, liver function tests, S. Albumin, S. urea, S. creatinine, calcium and INR) and abdominal ultrasonography.

**Fleur-De-Lis Technique:**

Marking was done while patient standing, wearing his/her underwear to settle the horizontal incision within it to be a hidden scar. Mid-line was marked from xyphoid process to symphysis pubis, and also the mid-clavicular line. The lower incision was demarcated at the lower abdominal crease 8 cm away from anterior vulvar commissure extending laterally 1-2 cm above inguinal line till the anterior axillary line. Pinch test was done to determine the level of resection, and the

upper incision was drawn passing through or slightly over the umbilicus forming an ellipse when it joined the lower incision. The vertical component was demarcated in supine position as an inverted V, its upper pole was corrected to inverted U to increase the resected skin, and its lower widest pole was placed around the umbilicus 10-16 cm long, and draw bisecting perpendicular lines (**Figure 1**).

In cases of belt lipectomy, posteriorly, the inferior gluteal line was demarcated to unite with the gluteal cleft, the extent of the tissues to be excised was determined by pinching the skin. Connection between anterior and posterior marks was done by adjusting both marks to meet in the mid axillary line.



**Figure (1): Marking of Fleur-De-Lis Abdominoplasty with Belt Lipectomy in post bariatric female patient. A) Showing horizontal limb marking and mid-line and mid clavicular line demarcation, B) Pannus pinching to determine the extent of excised skin, C) Lateral marking, D) Posterior marking, E) Complete anterior marking in supine position.**

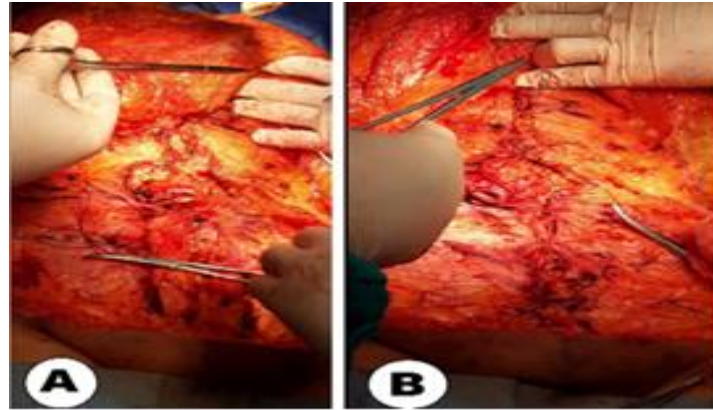
**Operative procedure:**

Patient was brought to operative theatre, lay in supine position, compressive stockings on both legs and feet were wrapped, anesthesia was inducted and the field was sterilized and toweled. Markings were re-verified with a

scalpel. The inferior incision was made to the level of deep fascia directly and superficially on lateral extent. Dissection was deepened to reach the muscle fascia with lateral dissection to allow abdominal flap re-draping with good electrocautery hemostasis. The umbilicus was separated

from the flap and marked with sutures for upper and lower poles. The operative table was flexed to determine the extent of excised skin and marked. The resected

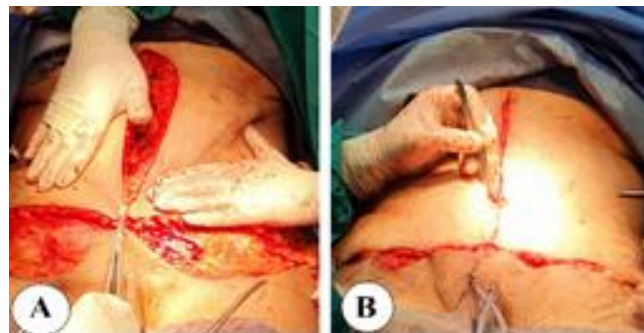
skin was excised as one unit (both horizontal and vertical limbs). Muscle plication of rectus diastasis was done after marking with ink (**Figure 2**).



**Figure (2): Muscle plication, Upper (A), Lower (B)**

The T-junction was tailor tacked and closure of the horizontal limb from lateral to medial in layers. Two drains were inserted and exited laterally. Then, closure of the vertical limb in layers and sitting of

the umbilicus within it, 8 cm away from the horizontal scar. The wound was cleaned and covered by steri-strep (**Figure 3**).



**Figure (3): A) T-junction re-draping, B) Umbilical sitting**

In cases with belt lipectomy, the patient was turned into prone position with precautions of position changing. The inferior incision was done first down to the underlying muscle fascia, dissection was progressed up to the level of markings, and the amount of excised skin was determined and excised. Then, skin was closed in layers. The umbilicus is

packed with vaslinized gauze and sterile dressing was applied over the whole wound and wearing the smallest suitable corset.

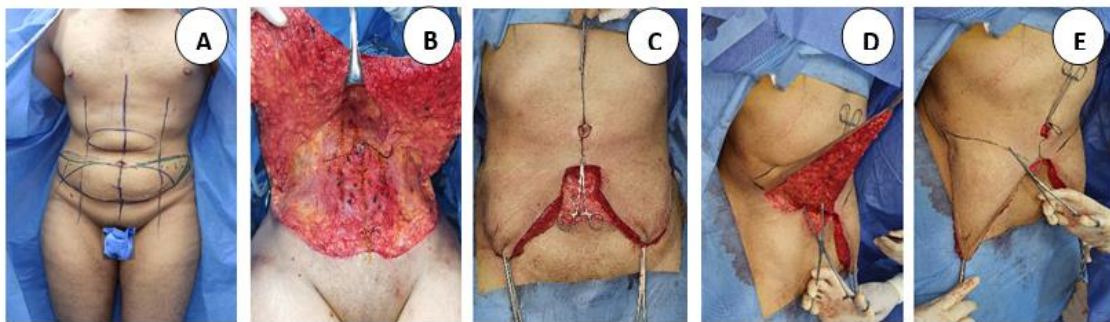
#### **Traditional Technique:**

Marking was similar to that of the horizontal limb of Fleur De Lis abdominoplasty **Figure 4 (A)**.

**Operative procedure:**

Patient was brought to operative theatre, lay in supine position, compressive stockings on both legs and feet were wrapped, anesthesia was inducted and the field was sterilized and toweled. It was usually done in combination with saline assisted liposuction (SAL) for the epigastric region. Injection of tumescent solution (1/1000 adrenaline/saline) and waited for 5 minutes, and then started liposuction. Markings were re-verified with a scalpel.

The inferior incision was made to the level of deep fascia directly and superficially on lateral extent. Dissection was deepened to reach the muscle fascia with central tunneling up to the level of xephi-sternum with good electrocautery hemostasis. The umbilicus was separated from the flap and marked with sutures for upper and lower poles. Muscle plication of rectus diastasis was done after marking with ink **Figure 4 (B)**.



**Figure (4):** A) Marking of the traditional technique, B) Central tunnel of dissection and marking for muscle plication, C) Umbilical exteriorization, D), E) Marking of the excised skin extent.

The operative table was flexed to determine the extent of excised skin and marked. The resected skin was excised and stay suture was made in the midline Figure 4 (D, E). Marking for exteriorization of the umbilical stump was done in the midline. V-shaped incision was made, and the umbilicus was pulled out through it Figure 4 (C). Drains were inserted and exited laterally. Wound closure in layers from lateral to medial and umbilical sitting by absorbable sutures. Wound cleaning, packing of the umbilicus with vaslinized gauze, application of steri-strep, sterile dressing, and wearing the smallest suitable corset.

**Post-operative care:**

Treatment included antibiotics and analgesics, encouraged the patient for early mobilization, drain removal after 3 days or summation of the drains is 100 cc/day, and follow up period of 6 months with photography.

**Statistical Analysis**

Qualitative data were expressed as frequency and percentage, and the comparison was done through Chi-square test (X<sup>2</sup>). Chi-square test (X<sup>2</sup>) was used for comparison between both groups as regard complications. Quantitative data

was expressed as mean and standard deviation, and the comparison was done through t test for comparison between

both groups as regard waist hip ratio pre and post-operatively. P-value was < 0.05 was considered significant.

## RESULTS

Our study included 30 patients having loss weight through bariatric surgery or with diet. They were divided into two equal groups.

**Fleur-De-Lis:** the study comprised from thirteen females, and two males with age range between 25 and 40 years old (mean 32.60), BMI at time of operation range between 24.49 and 29.94 (mean 27.5327), hemoglobin range between 11 and 15.10 (mean 12.82), fourteen patients lose its

weight by bariatric surgery and one patient by diet.

**Traditional:** the study comprised from fourteen females, and one male with age range between 27 and 47 years old (mean 36.00), BMI at time of operation range between 25.38 and 30.04 (mean 28.6367), hemoglobin range between 10.2 and 16.8 (mean 12.6467), eleven patients lose its weight by diet and four patients by bariatric surgery (**Table 1**).

**Table (1): Statistical analysis of both groups as regard age, sex, body mass index (BMI), weight loss mode, and Pre-operative Hemoglobin (Hgb)**

Parameters \ Groups		Group I (N = 15)		Group II (N = 15)		Stat. test	P-value
Age (years)	Mean	32.6		36		T = 1.79	0.083
	±SD	4.4		5.8			
Sex	Male	2	13.3%	1	6.7%	X <sup>2</sup> = 0.37	0.543
	Female	13	86.7%	14	93.3%		
BMI (kg/m <sup>2</sup> )	Mean	27.5		28.6		T = 2.04	0.051
	±SD	1.7		1.2			
Weight loss mode	Bariatric	14	93.3%	4	26.7%	X <sup>2</sup> = 13.9	< 0.001
	Diet	1	6.7%	11	73.3%		
Pre-operative Hgb (g/dl)	Mean	12.8		12.6		T = 0.32	0.744
	±SD	1.25		1.6			

**Table (2): Statistical analysis of both groups as regard operative time, Hospital stay, ICU admission, Blood transfusion, Rehabilitation time, Pre-operative waist hip ratio (WHR), and post-operative waist hip ratio (WHR)**

Parameters		Group I (N = 15)		Group II (N = 15)		Stat. test	P-value
Operative time (hrs.)	Mean	6.7		3.7		T = 4.7	< 0.001
	±SD	2.33		0.81			
Hospital stay (days)	Mean	7.47		8.87		T = 1.49	0.145
	±SD	2.4		2.7			
ICU admission	No	11	73.3%	9	60%	X <sup>2</sup> = 0.6	0.439
	Yes	4	26.7%	6	40%		
Blood transfusion	No	2	13.3%	8	53.3%	X <sup>2</sup> = 5.4	0.02
	Yes	13	86.7%	7	46.7%		
Rehabilitation time (days)	Median	28		28		MW = 111.5	0.967
	IQR	21 - 30		21 - 30			
Pre-operative WHR	Mean	0.91		0.85		T = 4.35	< 0.001
	±SD	0.04		0.05			
Post-operative WHR	Mean	0.82		0.83		T = 0.6	0.548
	±SD	0.03		0.04			

**Table (3): Comparison of waist hip ratio (WHR) (pre and post) in both studied groups**

Parameters		Pre-op (N = 15)	Post-op (N = 15)	Stat. test	P-value
Group I	Mean	0.91	0.82	T = 6.8	< 0.001
	±SD	0.04	0.03		
Group II	Mean	0.85	0.83	T = 1.09	0.283
	±SD	0.05	0.04		

**Table (4): Comparison between studied groups as regard complications**

Group		Group I (N = 15)		Group II (N = 15)		Stat. test	P-value
Complications	No	4	26.7%	7	46.7%	X <sup>2</sup> = 5.2	0.633
	Seroma	3	20%	2	13.3%		
	Hematoma	0	0%	1	6.7%		
	Wound Infection	1	6.7%	1	6.7%		
	Wound Dehiscence	3	20%	2	13.3%		
	Skin Necrosis	3	20%	1	6.7%		
	Scar Migration	0	0%	1	6.7%		
	Lymphedema	1	6.7%	0	0%		



**Figure (5):** Pre and post-operative photography for Fleur De Lis abdominoplasty case



**Figure (6):** Pre and post-operative photography for Traditional abdominoplasty case



## DISCUSSION

The post bariatric patients have redundancy all over the body not only the abdomen. Those patients had a very wide skin envelope, as if wearing an Ebron with an extra-large size for their body. Therefore, the patient had to undergo with more than one surgical touch to correct these deformities and gain the best body contour, either in the same operation or series of operations.

Not all patients were good candidates for Fleur De Lis technique. Each patient had to be carefully selected. The good candidates for Fleur De Lis abdominoplasty were the patients who don't have any chronic medical problem as DM because of vascular coagulopathy. Also, smokers were excluded as smoking may distort the vascularity of the abdominal flap. In addition, young female patient seeking for pregnancy were excluded. Patient's anthropometric measures were the criterion to suit the appropriate technique for each patient. Someone may need to combine more than one surgical procedure and another one may settle with only abdominoplasty.

Although the growing number of post bariatric surgery patients Publications claim that 25%–74% of post bariatric surgery patients desire a body contouring procedure, and 15%–20% finally take this step. Patient expectations in these procedures are rather high, especially in women. Some patients even incorrectly anticipate that body contouring surgery will result in a total body transformation, making their bodies comparable with persons who never experienced excessive weight. In fact, many studies report positive effects of body contouring

surgery on quality of life and body image. Some authors even state that not only is the aesthetic outcome enhanced, but also functional impairment can be improved and physical activity can be increased. However, little is known as to whether body contouring surgery provides long-lasting improvement of body image and quality of life and satisfies patient demands in the long run (*Martin et al., 2017*).

*Friedman and Wisner (2019)* stated that, being able to combine different surgical sites together with abdominoplasty is a mandatory approach for patients with MWL. It is highly recommended to start with the abdomen as the first stage, combined with other surgical sites, in order to limit the total body reconstruction to 2 surgical stages. The surgical plan is influenced by personal, clinical, medical, and financial parameters and is always individualized.

The anterior abdominal wall redundancy post massive weight loss (MWL) was composed of both vertical and horizontal vectors. The traditional abdominoplasty was not able alone to solve that problem. We added the vertical limb to allow lateral skin re-draping which by its role enhanced the waist hip ratio (WHR) desired by female patients.

Standard abdominoplasty technique enables excision of excess tissue in one plane only through a single transverse incision. The single incision may be inadequate in addressing excessive tissue. The Fleur De Lis (FDL) technique removes supraumbilical horizontal excess via a vertical excision, in addition to the transverse incision (*Siva and Sambasiva, 2013*).

*Aly, and Mueller (2014)* found that MWL post bariatric patients often have redundant skin and subcutaneous tissue in both the horizontal and vertical vectors. Traditional abdominoplasty techniques may fail to adequately correct the horizontal laxity in those patients. To correct these difficult abdominal contour cases, we offered patients abdominoplasty with a fleur-de-lis vertical excisional component.

In our study, we found that there was no significant difference between the two groups as regard rate of complication either minor or major complications while keeping in mind all possible complications. Their prevention precautions and patient safety above all considerations. Also, there were no significant differences between the two groups as other statistical values rather than comparison between waist hip ratio pre and post-operative which had a significant difference in Group A, especially in post bariatric patients. This led us to prefer the Fleur De Lis technique in those patients. Also, keeping in mind the subjective evaluation of each patient which was at the side of Fleur De Lis technique more than the Traditional Group.

*Rosenfield et al. (2019)* found similar rates of postoperative complications for both techniques. Based on a literature review from 1960 to the present, this is the largest series analyzing the outcomes of abdominoplasty in massive weight loss patients.

In an outcome-driven era, it is imperative to strive for excellence in clinical and patient-reported outcomes. The bar should be set at a zero-

complication rate. However, even in the best surgical hands, complications occur, with the American Society for Aesthetic Plastic Surgery reporting complication rates after abdominoplasty including necrosis, contour irregularity, and hematoma (*Danilla et al., 2014*).

*Seth et al. (2017)*, cumulative data suggests one in three patients experience at least one minor complication post abdominoplasty.

Fleur De Lis Abdominoplasty was proofed to be more beneficial for the patient who need lower Feminine Body Contouring, its better outcome in maximum waist circumference, and waist hip ratio (WHR) with no significant complications comparing to Traditional technique.

## CONCLUSION

Fleur De Lis Abdominoplasty was the best option for the female patients especially the post bariatric ones to correct vertical and horizontal skin redundancy, and enhance the waist hip ratio and get the maximum aesthetic, and functional results.

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## دراسة مقارنة بين طريقة زهرة الزنبق والطريقة التقليدية في شد البطن في حالات مابعد فقدان الوزن

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**خلفية البحث:** يسعى العديد من المرضى الى عمليات تنسيق القوام مابعد فقدان الوزن الكبير حيث أنهم يعانون من ترهلات كبيرة في الجلد. ولذلك، فإن عمليات شد البطن من الممكن أن تعمل على تحسين الشكل العام للجلد وتزيل هذه الترهلات. كما ان هؤلاء المرضى قد يحتاجون إلي أكثر من عملية جراحية للحصول على القوام المثالي.

**الهدف من البحث:** تقييم نتائج عمليات شد البطن على طريقة زهرة الزنبق والطريقة التقليدية في حالات مابعد فقدان الوزن الكبير.

**المرضى وطرق البحث:** اشتملت هذه الرسالة على 30 حالة مابعد فقدان الوزن، والذين حضروا إلى مستشفيات جامعة الأزهر بالقاهرة (مستشفى الحسين الجامعي ومستشفى السيد جلال الجامعي) خلال الفترة مابين يناير 2020 و يونية 2021. وقد تم تقسيم المرضى إلى مجموعتين متساويتين: المجموعة (A) تم إجراؤها بطريقة زهرة الزنبق، والمجموعة (B) تم

إجراؤها بالطريقة التقليدية لشد البطن ومقارنة النتائج بين الطريقتين.

**نتائج البحث:** هذه الدراسة رجّحت كفاءة طريقة زهرة الزنبق على الطريقة التقليدية في حالات فقدان الوزن الجراحي كعملية آمنة حيث أنها تعطي نتائج ممتازة في تنسيق القوام لتحسين جودة الحياة، والأداء الجنسي، والأنشطة الإجتماعية والبدنية.

**الاستنتاج:** شد البطن بطريقة زهرة الزنبق هو اختيار جيد في مريضات ما بعد فقدان الوزن الجراحي مع وجود ترهل جلد البطن العلوي واللاتي يردن الحصول علي محيط الخصر الأنثوي المثالي والنسبة الأنثوية مابين محيط الخصر ومحيط الأرداف.

**الكلمات الدالة:** شد البطن ما بعد فقدان الوزن الزائد، شد البطن بطريقة زهرة الزنبق، شد البطن التقليدي.