

**2022**  
**Lipo-abdominoplasty & Circumferential Body Contouring For Massive Weight Loss**

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**DISCLOSURE OF CONFLICTS OF INTEREST**

E. Antonio Mangubat, MD

- Solta Medical, consultant
- KMI, royalty
- Shippert Medical Technologies Corp., royalty

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**Abdominoplasty Introduction**

- Anatomy and physiology
- History
- Clinical approach
  - Abdominoplasty
  - Massive weight loss considerations
- Traditional vs. Lipo Abdominoplasty
- Discussion

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### Anatomical Considerations

- **Supra-Scarpal Fat**
  - Dense
  - Robust blood supply (subdermal plexus & perforators)
  - **Preservation of adequate amounts of this fat is critical to maintaining blood supply to the overlying skin**
- **Scarpa**
  - Tough, can be used to secure flap approximation & internal thigh lifts
  - **Preservation decrease the risk for seromas thought to be by preservation of lymphatic trunk**
- **Sub-Scarpal Fat**
  - More likely to be rendered ischemic during abdominoplasty – can be removed by direct excision or liposuction

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### Scarpa's Fascia Fibrous Layer of the SFS

- **Thins out laterally** – about the mid axillary line
- **Superiorly** – thins out over the chest
- **Inferiorly** – Fuses with the deep fascia of the thigh below the inguinal ligament (anterior hip flexure crease).

Photo credit: Anatomy, Regional and Applied, page 133 Gray's Anatomy, Page 953

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### Abdominal Musculoaponeurotic System Soft tissue layers of the abdominal wall

Hunstad, Joseph P., and Remus Repta. Atlas of Abdominoplasty. Philadelphia: Saunders/Elsevier, 2009. Pg. 8, Fig. 2.4.A, D-F

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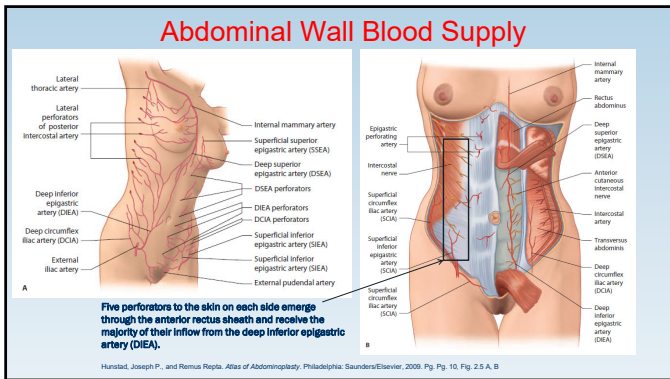
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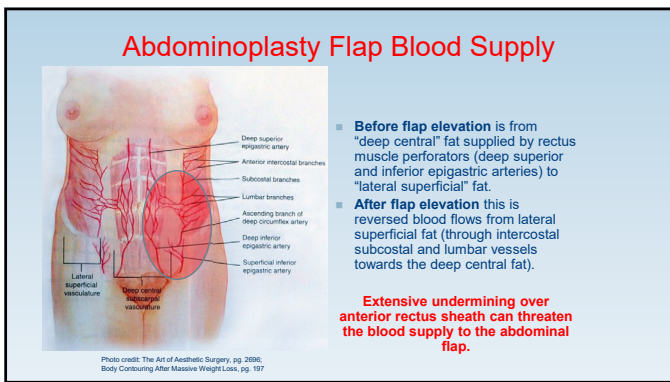
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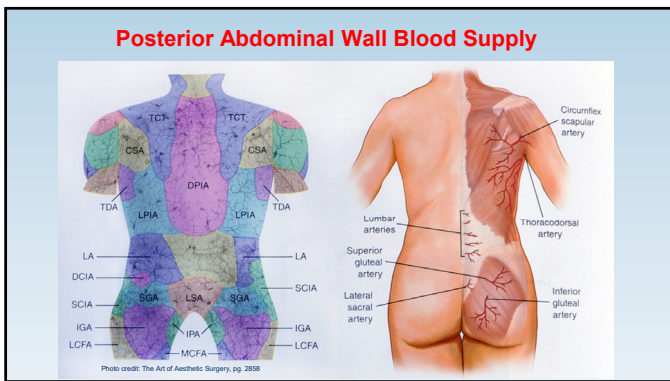
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### Umbilicus

The diagram shows the abdominal wall with the umbilicus at the center. Labels include: Superior epigastric artery, Arcuate line, Large ascending branch from deep inferior epigastric artery, Deep inferior epigastric artery, Flow along ligamentum teres, Subdermal vascular plexus, Small perforators from deep inferior epigastric artery, and Flow along median umbilical ligament.

- 14 cm above pubic symphysis or 10 cm above the pubic hair (at the top of the iliac crest)
- Morbidly obese
  - Stretched, distorted, elongated
  - Weak periumbilical fascia
  - **High risk for periumbilical defects, hernias and bowel injury**

Photo credit: The Art of Aesthetic Surgery, pg 2941

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### Lymphatics

The top diagram shows the lymphatic drainage of the abdomen, with labels for Axillary lymph basins. The bottom diagram is a cross-section of the skin layers: Dermis, Suprascapular fat and SFS layer, Scarpa's fascia, Subscapular fat and SFS layer, and Loose areolar tissue. Lymphatic ducts are shown within the subscapular fat layer.

- **Lymphatic plexus**
  - Sub-scapular fat layer
- **Umbilicus is a natural watershed**
  - Drains to the superficial inguinal lymphnodes below the umbilicus and above the umbilicus to the pectoral axillary lymphnodes

**Preservation of Scarpa's decreases the risk for seromas – esp. in the lower abdomen (Avelar Technique preserves this, hence the need for no drains)**

Photo credit: The Art of Aesthetic Surgery, pg 297-8  
 Ref - Le Louarn C. Partial subfascial abdominoplasty. Aesthetic Plast Surg 20: 123-127, 1996  
 Hunsat, Joseph P., and Ferrus Rieja. Atlas of Abdominoplasty. Philadelphia: Saunders/Elsevier, 2009. Pg. 11, Fig. 2.6, 2.7

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### Important Considerations in Massive Weight Loss

- **Background** – post pregnancy; post weight loss
- **Weight** – stability, BMI <30
- **Co-morbidities** – **Sleep Apnea**, diabetes, HTN, CAD, **Pulmonary Problems – COPD, h/o VTE**
- **Prior abdominal surgeries** – scars, location
- **Would healing problems** – e.g., keloids
- **Medications** – **blood thinners**
- **Chronic pain issues**
- **Immunodeficiency** – steroids, immunosuppressants
- **Lifestyle** – nutrition, activity, occupation, **NO smoking** or excessive alcohol use
- **Patient expectations** – motivated, realistic

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**Pre-Op Preparation**

- Smoking cessation – 4-6 weeks prior
- D/C all blood thinners for 2 weeks (with PCP's concurrence)
- D/C all herbal products & supplements not approved by the surgeon for 2 weeks prior (e.g. fish oil, omega-3, vitamin E, etc.)
- Medical clearance
- Wearing an abdominal binder for 2 weeks prior to surgery
- Antimicrobial soap/cloth (e.g., Chlorhexidine Gluconate 2%) night before and morning of surgery

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**Realistic Patient Expectations**

- "I want a flat belly."
- "I just want the lose skin to be gone."
- "I want a slim waist."
- "I want a 6-pack."
- "I have ugly scars from previous surgery can you get rid of them?"
- "My tummy is just too poochy after I had my babies."
- Does patient want to look great in her clothes or out of them?

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**Exam**

- **Skin**
  - Elasticity
  - Areas of Redundancy
  - Striae – location, extent – is it above or below the umbilicus?
  - Inform the patient what is likely to be left behind and that tight skin will loosen with time.
- **Striae**
  - Attenuated/absent dermis, risk of wound separation
- **Fat Distribution** – Intra-Abdominal vs Subcutaneous
- **Zones of Adherence**
- **Muscle/Fascia** – Hernia, Diastasis
- **Scar**

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### Zones of Adherence

- Natural moorings of the subcutaneous tissues to the underlying fascia
- Inflation and deflation of skin and subcutaneous tissues happens **between** these zones.
  - Midline
  - Transversely across the upper abdomen and both groins

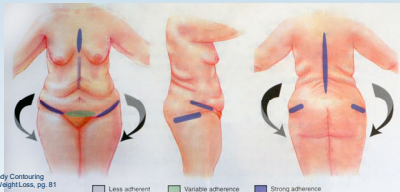


Photo credit: Body Contouring After Massive Weight Loss, pg. 81

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### Abdominoplasty Assessment

Loose skin and lipodystrophy of the abdomen, waist, hips and back.



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### Case Study

Upper midline scar, minimal lipodystrophy and significant loose skin.



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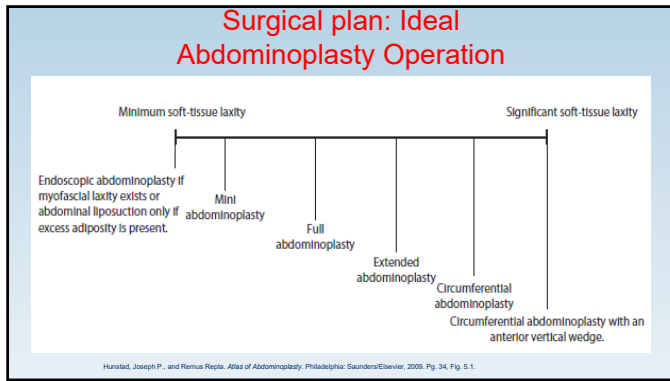
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- ### Areas of Redundancy
- Lower abdomen pannus alone
    - Standard Abdominoplasty
  - Upper abdominal deformity/waistline zone of adherence
    - Fleur-de-Lis Abdominoplasty
  - Public ptosis
    - May need direct excision/lower incision to lift this +/- Liposuction
  - Upper medial thigh
    - May benefit from an "internal" Scarpa lift (applied anatomy – Scarpa is attached to the fascia lata below the inguinal ligament) in preparation for a later spiral/Medial Thigh Lift
  - Lateral thigh
    - High Lateral Tension Abdominoplasty (longer incision laterally)
  - Gluteal ptosis
    - Lower Body Lift with Lateral Thigh Lift (Belt Lipectomy); Circumferential Body Contouring.

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- ### Informed Consent
- Loss of skin – lower area of the flap above the pubis
  - Distortion or malposition of the umbilicus
  - Scar at the lower midline of the abdomen at the original site of the umbilicus
  - Scar Asymmetry
  - Failure to narrow waistline
  - Seroma
  - Abdominal/clitoral numbness
  - Dog ears
  - Bleeding
  - Deep Vein Thrombosis and Pulmonary Embolism

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### DVT/PE Prevention

Intraoperative positioning	The knees are kept flexed using a pillow
Sequential compression device	The device is placed and activated prior to general anesthesia
Hydration	Intravenous fluids are administered and hydration is maintained by monitoring urine output
Perioperative medication	Lovenox is used
Postoperative activity	Ambulation several hours after the procedure and routinely thereafter is encouraged.

Hurstad, Joseph P., and Remus Repta. Atlas of Abdominoplasty. Philadelphia: Saunders/Elsevier, 2009. Pg. 241, Fig. 15.1

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### Rare & Severe Complications

- Anesthesia
  - Excessive IV fluids
  - Hypothermia
    - Acidosis
    - Defective coagulation
  - Aspiration pneumonia
  - Severe hypoxia
  - Cardiac arrest
  - Allergies
  - Lidocaine loads in large patients
  - Malignant hyperthermia
- Intra-operative care
  - Excessive blood loss
  - Injury to the abdominal organs
- Post-operative care
  - Deep venous thrombosis
  - Pulmonary embolism
  - Infections
  - Necrotizing fasciitis

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### Recognize the Unhealthy Patient

- Medical history: allergies, cardiac, etc.
- Prior liposuction
  - Concrete interstitial scarring
  - Severe cannula resistance
  - Tumescant infusion cannulas are dangerous
  - Abdominal perforations
- Large patients = trouble. BMI>32 associated with increased incidence of all complications
  - Anesthesia management
  - DVT
  - Skin necrosis
  - Etc.
  - Require extensive experience

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**Deep Venous Thrombosis  
Pulmonary Embolism**

- Under recognized danger
- Deadly
- Not that uncommon

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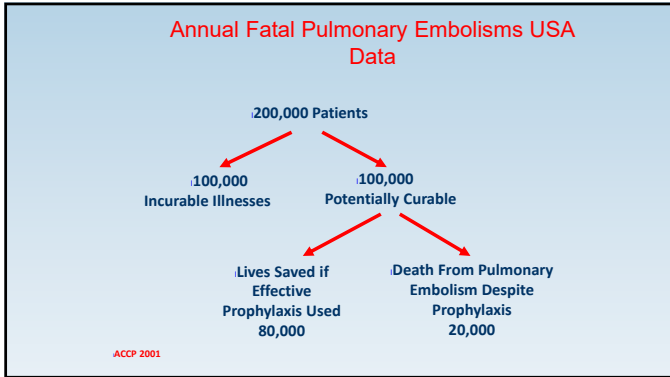
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**Venous Thromboembolism  
Virchow's Triad**

- Stasis
- Vessel Damage
- Activation of Coagulation

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**Incidence of Postoperative DVT  
Fibrinogen Data**

Surgery	# Publications	Incidence
· Hip	22	59%
· General	28	29%
· Neurosurgery	6	29%
· Gynecologic	8	19%
· Prostatic	13	11%
· Liposuction	?	????

·Bergqvist, Venous Thromboembolism, 1983

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- Venous Thromboembolism  
Symptoms**
- Most common symptom?
  - **None**
  - Calf/Thigh Pain
  - Leg Swelling
  - Dyspnea, Chest Pain, Hemoptysis

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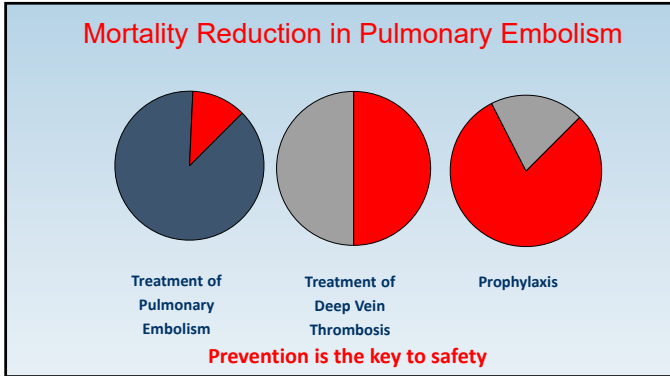
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**DVT Prevention**  
General Surgery

RISK	RECOMMENDATION	LEVEL
Low risk	Early ambulation	1C
Moderate risk	<ul style="list-style-type: none"> <li>&gt;Lo dose unfractionated heparin</li> <li>&gt;Lo Mol Wt Heparin</li> <li>&gt;Intermittent pneumatic compression</li> <li>&gt;Elastic stockings</li> </ul>	1A
High risk	LDUH or Higher dose LMWH (40mg/day) or IPC if high risk of bleeding	1A
Very high risk	LDUH or higher dose LMWH combined with IPC or warfarin (INR 2.0-3.0)	1B

ACCIP Guidelines -2001

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**Are Compression Stockings Effective in Preventing DVT?**

- Air travel study: 200 patients randomized w/ & w/o stockings
- All had duplex ultrasonography before and after travel
- 12 pts detected w/ symptomless DVT **NOT** using stockings
- No DVT in the volunteers using stockings.
- Blood tests
  - 11 heterozygous for factor V mutation
  - 4 prothrombin gene mutation.
  - 2 DVT volunteers were positive for factor V Leiden.
  - Full blood count, platelet, and other assays were not predictive of DVT.
- 10% of air travelers > 50 years develop symptomless DVT
- elastic compression stockings are effective DVT prophylaxis.

Scurr JH, et al. Frequency and prevention of symptomless deep venous thrombosis in long-haul flights: a randomised trial. Lancet May 12, 2001;357:1485-9.

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**Venous Thromboembolism**  
Cost of Prevention

Method	Relative
Elastic Stockings	1
Low-Dose Heparin	10
Warfarin	15
Pneumatic Compression	20
Low-Molecular-Weight Heparin	30
IVC Filter	400
<b>Diagnosis And Treatment of PE</b>	<b>800</b>

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### Abdominoplasty History

- 1890 – Demars & Marx (France)
- 1899/1910 – Kelly HA (Johns Hopkins, USA) – Abdominal Lipectomy (no - 16 .39 Pounds – 90cmx 31 cmx7cm)
- 1957 – Gillies & Millard (USA) – “Jack-Knife” position, Post-op Knee Flexion to reduce tension on transverse closure.
- 1960 – Gonzalez-Ulloa – “Belt Lipectomy”
- 1967 – Pitanguy – 300 Transverse Abdominoplasties (lateral edges curved down)
- 1972 – Kamper – Circumferential Resection After Massive Weight Loss
- 1972 – Reginault (Montreal, Canada) – “W” technique

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### Abdominoplasty History (cont'd)

- 1973 – Grazer (California, USA) Pitanguy – Rectus Plication; Body Contouring for the massive weight loss patient.
- 1974 – Baroudi – “Quilting” techniques to decrease seroma
- 1977 – Illouz – Blunt-tipped Liposuction Cannula
- 1985 – Dellon – “Fleur-de-lis” Abdominoplasty
- 1987 – Klein – “Tumescent” Technique for Liposuction Surgery.
- 1984-1990 – Converse, Illouz, Hetter – “Hydrodissection”
- 1988 – Toronto - Wide Rectus Abdominal Plication
- 1991 – Lockwood – Superficial Fascial System (SFS); High Lateral Tension Abdominoplasty

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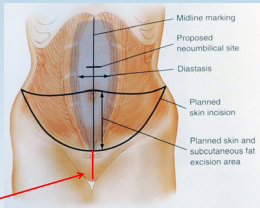
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### Standard Abdominoplasty (Tummy Tuck)

- **Panniculectomy:** Removal of excess skin and fat of the lower anterior abdomen
- **Rectus Abdominis Plication:** Tightening of the abdominal muscles (Abdominal Wall Reconstruction)



6.5 - 7.5 cm above the vaginal commissure (with the skin stretched)

**Works well for people who only have small amounts of fat or loose skin, but often fails to adequately correct the complex contour deformities of the massive weight loss patient.**

Photo credit: The Art of Aesthetic Surgery, pg 2054

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### Skin Flap

- Inferior incision
- Flap elevation superiorly (up to xiphoid)

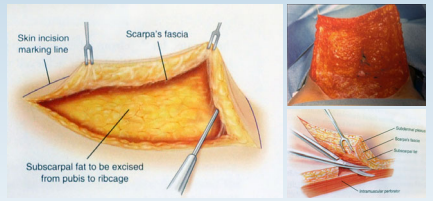


Photo credit: The Art of Aesthetic Surgery, pg 2930, 2966-2967

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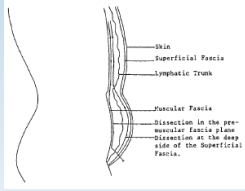
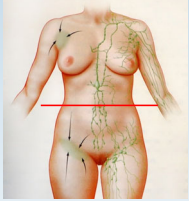
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### Subfascial Abdominoplasty

The umbilicus is a natural watershed between the lymphatics of the upper abdomen and the lower abdomen.

Staying just superficial to the Scarpa's below the umbilicus avoids transecting the lymphatics, decreasing the risk for seromas.



Le Louram C. Partial subfascial abdominoplasty. Aesthetic Plast Surg 20: 123-127, 1996

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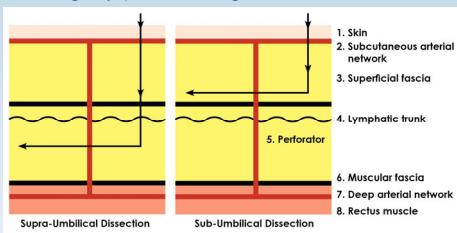
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Staying just superficial to the Scarpa's below the umbilicus avoids transecting the lymphatics, decreasing the risk for seromas.



Le Louram C. Partial subfascial abdominoplasty. Aesthetic Plast Surg 20: 123-127, 1996

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### Standard Rectus Plication

- Realign rectus muscles
- Narrow the abdominal circumference
- Exaggerate the waist line.

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**Only lateral segmental perforators remain**

**Lose Most Major Arteries**

© Nemoursfasky, Clark, Cappella. 2009. 117-121. 978-0-7817-8262-5. Body Lift: An Approach to 400 Pounds after Obesity in the Massive Weight Loss Patient.

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### Ideal Umbilicus

Hernstad, Joseph P., and Renee Raygo. Atlas of Abdominoplasty. Philadelphia: Saunders/Elsevier, 2008. Pg. 142. Fig. 12.2

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### Umbilical Decisions

- **No skin excess above, mild below**
  - Leave intact (e.g. Mini-Abdominoplasty)
- **No skin excess above, moderate below, high riding umbilicus**
  - Can "float" with release of stalk (<2 cm from origin)
- **Large excess above and below**
  - Circumscribe and translocate
- **Scarred/prior surgery/herniorrhaphy**
  - Excise plus "neo-umbilicus" options

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### Options for Umbilical Reimplantation

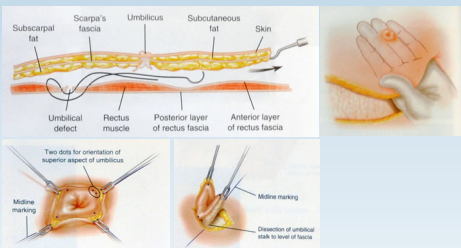


Photo credit: The Art of Aesthetic Surgery, pp. 2956, 2964

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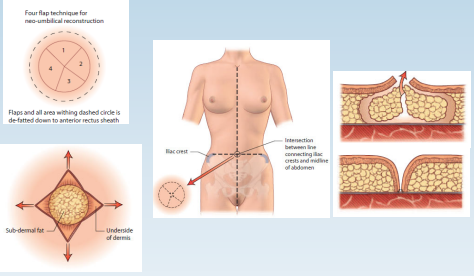
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### Neoumbilicoplasty



Hornstad, Joseph P., and Remus Repto. Atlas of Abdominoplasty. Philadelphia: Saunders/Elsevier, 2009. Pg. Pg. 151, Fig. 12.26 - 12.30

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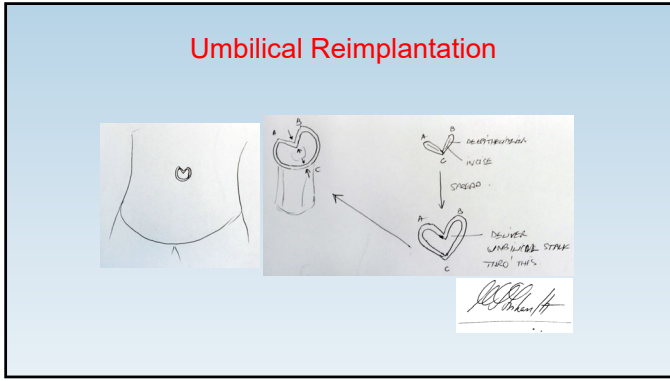
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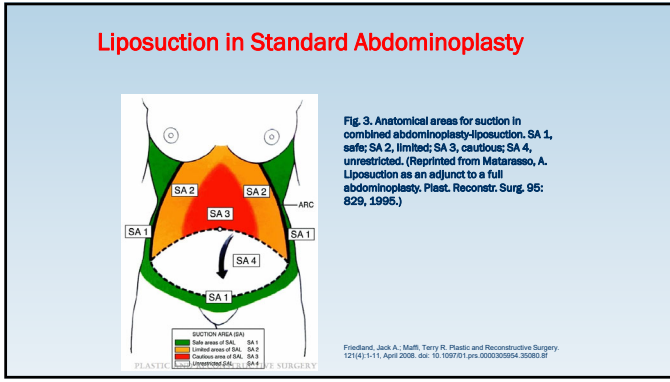
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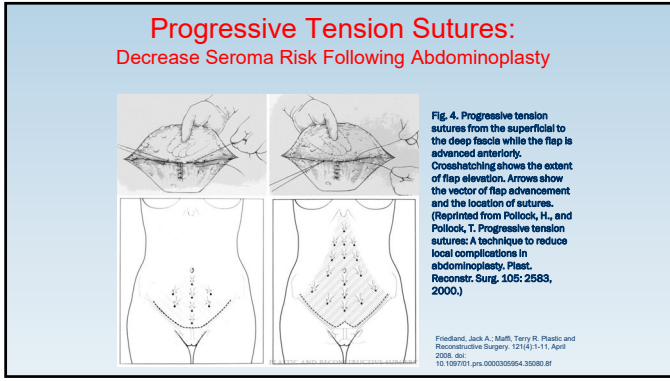
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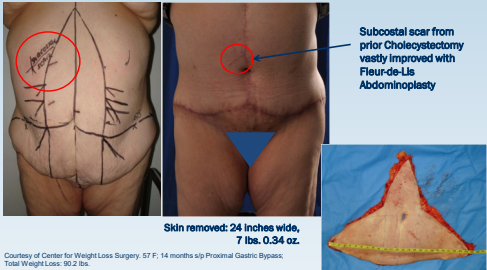
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### Fleur-de-Lis Abdominoplasty to Address Sub-Costal Scars



Subcostal scar from prior Cholecystectomy vastly improved with Fleur-de-Lis Abdominoplasty

Skin removed: 24 inches wide, 7 lbs. 0.34 oz.

Courtesy of Center for Weight Loss Surgery. 57 F, 14 months w/p Proximal Gastric Bypass. Total Weight Loss: 90.2 lbs.

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### Matarasso Abdominoplasty Classification System

- Based on traditional Abdominoplasty
- Avelar technique significantly alters classification

Type I	Minimal Laxity	Variable	Minimal Flaccidity	Liposuction or Ultrasonic Liposuction
Type II	Mild Laxity	Variable	Mild Lower Abdominal Flaccidity	Liposuction plus Mini-Abdominoplasty
Type III	Mod. Laxity	Variable	Moderate Abdominal Flaccidity	Modified Abdominoplasty with Rectus Plication Possible Liposuction
Type IV	Severe Laxity	Variable	Significant Abdominal Flaccidity	Standard Abdominoplasty

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### After Traditional Abdominoplasty

- Only lateral segmental perforators remain
- Minor retrograde flow from the posterior deep circumflex iliac
- The ascending branch of the superficial circumflex iliac

**Lose Most Major Arteries.**

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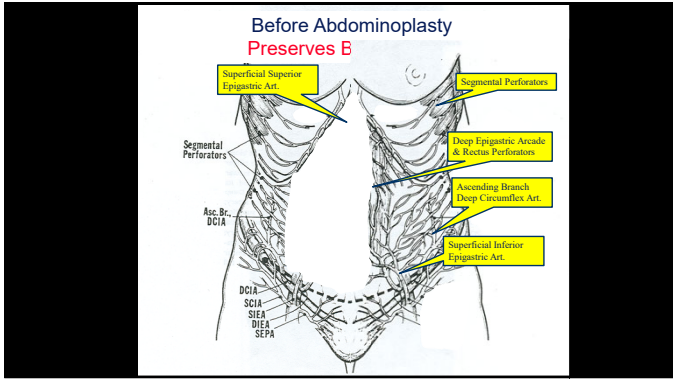
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**Lipo-Abdominoplasty:**  
Advantages & Disadvantages

- **First described by Avelar 1999**
- **Advantages**
  - Skin excision similar to traditional TT
  - Existing neurovascular supply preserved
    - Flap remains axial
  - No drains and considerably less pain
  - Faster recovery
    - Tradition TT = 2 weeks
    - Lipo TT = 1 week
- **Disadvantages**
  - ? Less skin mobility

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### Tumescent Technique

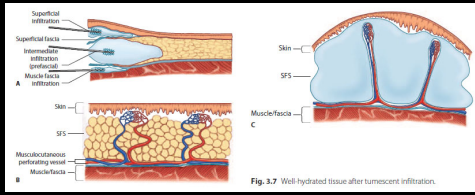


Fig. 3.7 Well-hydrated tissue after tumescent infiltration.

Harshbarger, Joseph P., and Patricia Poulos. Atlas of Abdominoplasty, Proximal/Body. Saunders/Elsevier, 2009. Pg. 19, Fig. 3.7

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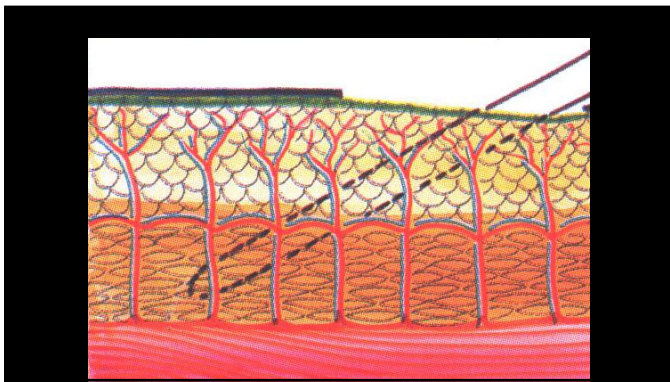
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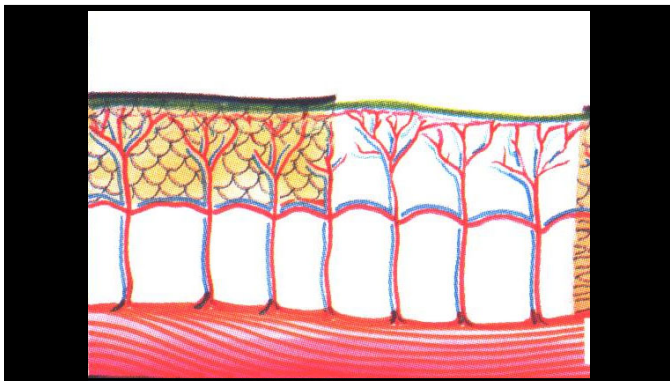
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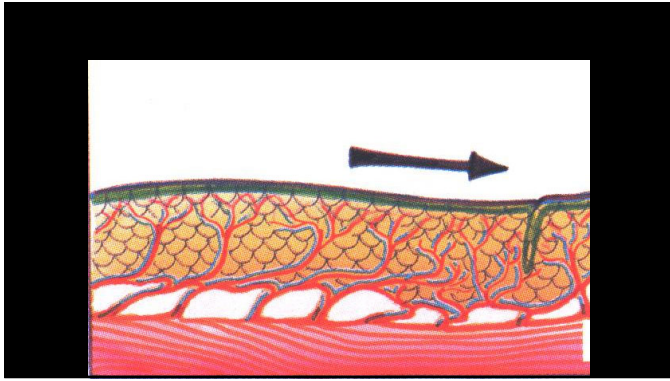
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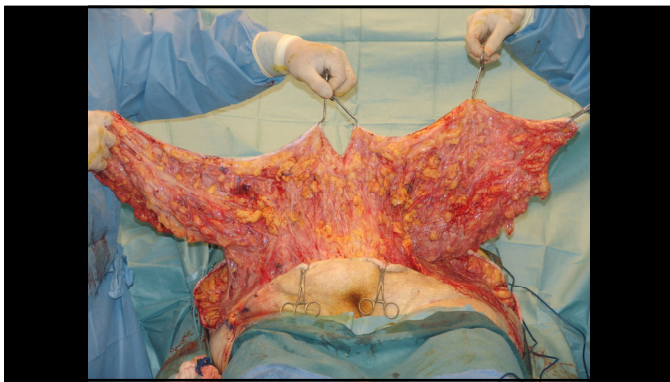
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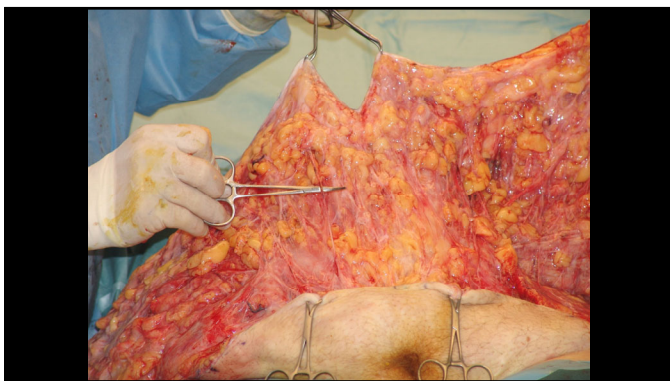
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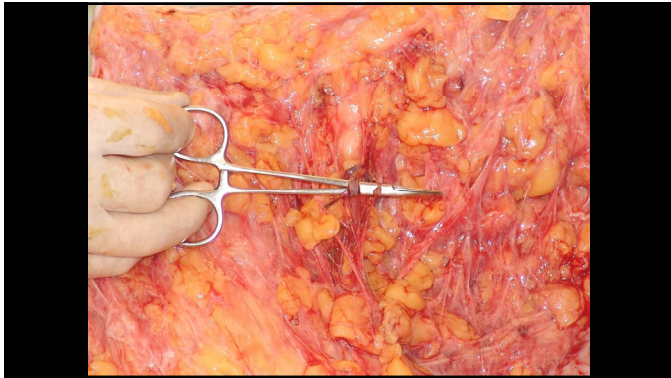
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**Liposuction Technique**

- **Standard tumescence**
  - Stay within 35-50 mg/kg lidocaine limit
  - Virtually bloodless
- **Fat disruption technique for speed**
  - Vasoconstriction last only ~90min
  - Speed critical for larger volumes
  - Smoother results

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**Case Study**

Not a traditional Abdominoplasty candidate.

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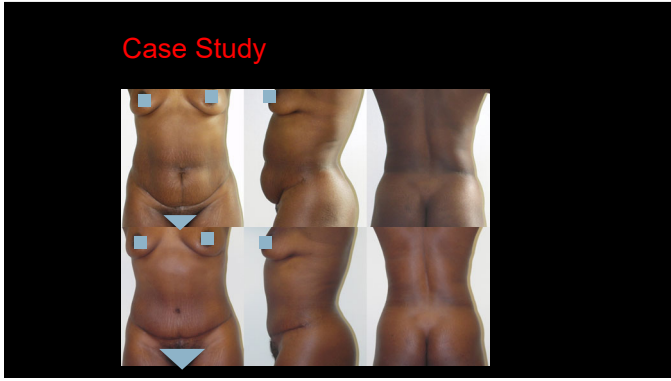
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**Lipo-Bodylift**

- Extension of lipo-abdominoplasty (Avelar)
- Circumferential skin excision
- Massive weight loss
- Challenging procedure
  - Prolonged operative time
  - Blood loss
  - Potential complications increased

Courtesy of La Belle Vie Surgery Centers

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**Patient Evaluation**  
Risk factors

- Obesity
- Underlying disease
- Smoking
- Prior surgery
- Hernias
- Anesthesia risk
- BODY LIFT VIDEO (You Tube link 1)

Courtesy of La Belle Vie Surgery Centers

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# Full Body Lift using the Avelar Concept

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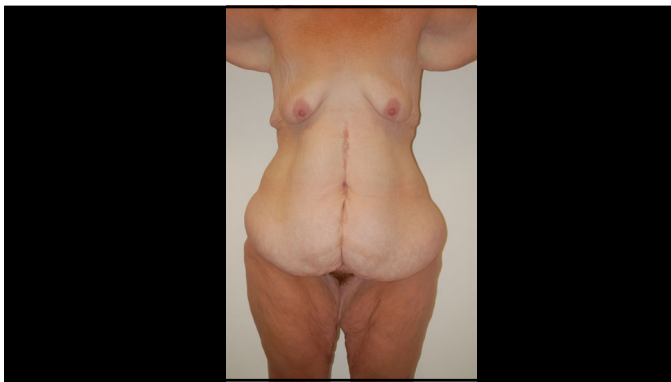
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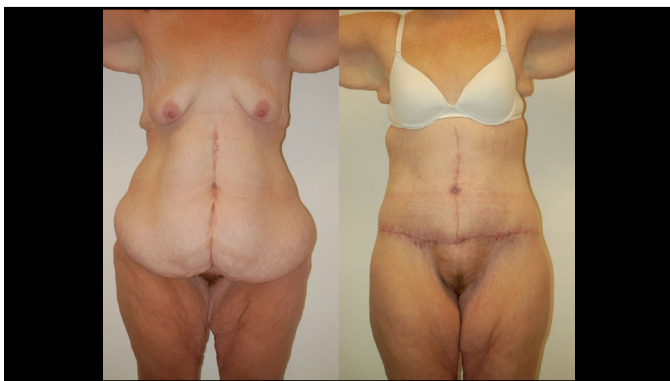
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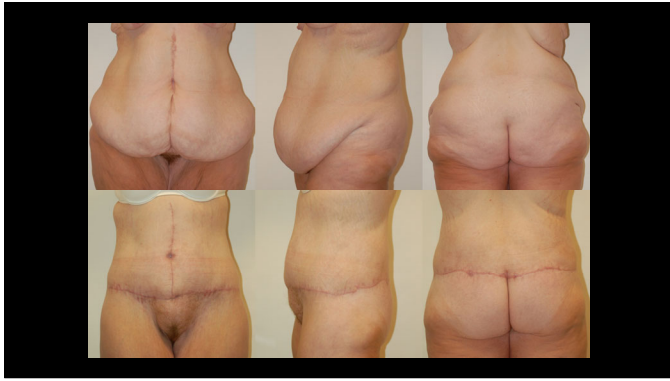
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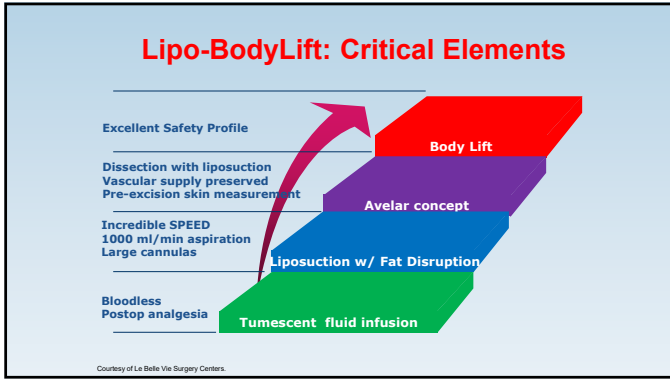
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Traditional vs. Lipo-Bodylift	
<ul style="list-style-type: none"> <li>• <b>Bodylift N=200 ++</b></li> <li>• Hospital Stay = 3days</li> <li>• Drains = 25 days</li> <li>• Rtn to work = 6 wks</li> <li>• Operative time = 6 hrs (range 4-12)</li> <li>• Complications:               <ul style="list-style-type: none"> <li>■ PE 1%</li> <li>■ Transfusion 15%</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Lipo-Bodylift N=24</b></li> <li>• Outpatient</li> <li>• No drains</li> <li>• Rtn to work = 2 wks</li> <li>• Operative time = 4.5 hrs (range 3-6)</li> <li>• Complications:               <ul style="list-style-type: none"> <li>■ PE = 0</li> <li>■ Transfusion = 0</li> </ul> </li> </ul>

++Nemerofsky, Ollak, Capella. PRS 117 (2): 414-430. Body Lift: An Account of 200 Consecutive Cases in the Massive Weight Loss Patient. Courtesy of La Belle Vie Surgery Centers.

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**Lipo-Bodylift**  
What Makes Speed Possible?

- Tumescant fluid infusion
  - Bloodless
  - Postop analgesia
- Liposuction with Fat Disruption
  - Introduced in 2004
  - Incredible SPEED
  - 1000 ml/min aspiration
  - Large cannulas with smooth results
- Avelar concept
  - Dissection performed with liposuction
  - Vascular supply preserved
  - Pre-excision skin measurement

Courtesy of La Belle Vie Surgery Centers

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**Lipo-Bodylift**  
Highlights

- Liposuction **integral** to technique
  - Extensive liposuction is expected & safe
  - Greater body sculpting possible
  - Circumferential liposuction standard
- **Existing blood supply preserved**
- No drains
- Faster recovery
- SPEED

Courtesy of La Belle Vie Surgery Centers

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**Tools of the Trade**

- Advanced ultrasound for superficial work
- Macro fat disruptors for large volume lipo
- Small VentX cannula for refined work

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**VASER Ultrasonic Liposuction**

- Complete system optimized **for harvesting fat for subsequent grafting**
- Energy specifically tuned to preserve connective tissue and **maintain fat cell & ADRC (Stem Cell) viability**
- Atraumatic cannulas and precise suction pressure control to **minimize fat cell trauma**



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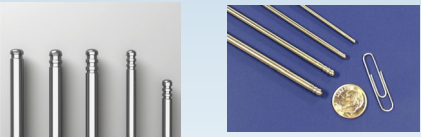
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**Proprietary Probe Design**

- VASER® probes are small diameter (2.2 – 4.5mm)
- Probe vibrates very short distance 36,000 times/second
- No sharp edges or cutting
- Designed to significantly increase efficiency



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**Liposuction Technique**

- Fat disruption critical for **SPEED**
  - Vasoconstriction = almost bloodless
  - Speed critical for larger volumes
  - Smoother results
- Standard tumescence
  - Stay within 35-50 mg/kg lidocaine limit
  - Virtually bloodless

Courtesy of La Belle Vie Surgery Centers

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**Fat Disruption Concept**

- Not a new idea
- Chopped up fat is easier to aspirate
- VASER (Ultrasonic Liposuction)
  - Fat disruption before liposuction
  - Great in tough areas (scar, gynecomastia)
  - Made aspiration easier

Courtesy of La Belle Vie Surgery Centers

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**Fat Disruption Concept**

- Blugerman liposhifting instrument
  - Introduced in 2002 Liposuction World Congress
  - Designed to create mini fat grafts internally
  - *in vivo* fat grafts manually shifted to fill defect
  - Solid core cannula 3-4mm diameter
- Current concept conceived in 2003
  - Mechanical disruption of fat infrastructure
  - Goal is to **DESTROY FAT** with large cannulas
  - Detach the fat from its stroma before suction
  - Uses much larger cannulas: 5-6mm typical

Courtesy of La Belle Vie Surgery Centers

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**Fat Disruption  
Critical Advantages**

- **SPEED**
  - Rapid volume reduction
  - Aspiration speeds up to 1500ml/min
  - Large cannulas without irregularities
  - Critical factor to safety
- Smooth results regardless of cannula size
  - No suction applied during disruption
  - Even superficial passes do not leave divots
- Especially useful for:
  - Large volume reduction
  - Beginning liposuction surgeons

Courtesy of La Belle Vie Surgery Centers

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**Rapid Volume Reduction**  
How is it possible?

- Flow is function radius of cannula<sup>2</sup>
- Large cannulas

$$FLOW = \pi r^2 \times Velocity$$

Courtesy of La Belle Vie Surgery Centers

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**Effect of Cannula Diameter on Flow**

Courtesy of La Belle Vie Surgery Centers

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**Fat Disruption**  
Instrumentation and Technique

- Large 5 & 6mm cannulas work best
- Use similar size aspiration cannulas
- Fat disruption
  - Not designed for fat grafting
  - Pulls fat off stroma **WITHOUT SUCTION**
  - Fast resistance free flow with suction
  - Smooth results

Courtesy of La Belle Vie Surgery Centers

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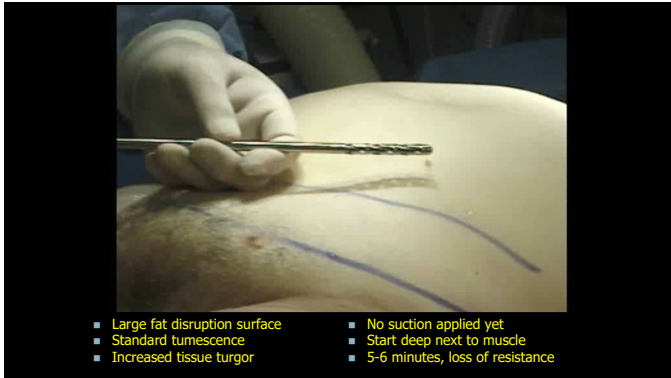
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- Large fat disruption surface
- Standard tumescence
- Increased tissue turgor
- No suction applied yet
- Start deep next to muscle
- 5-6 minutes, loss of resistance

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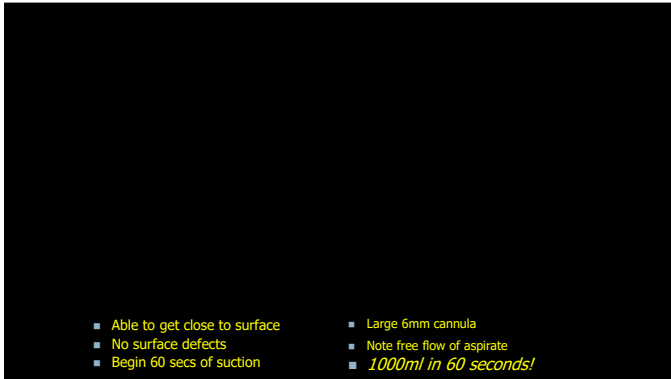
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- Able to get close to surface
- No surface defects
- Begin 60 secs of suction
- Large 6mm cannula
- Note free flow of aspirate
- *1000ml in 60 seconds!*

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after disruptor

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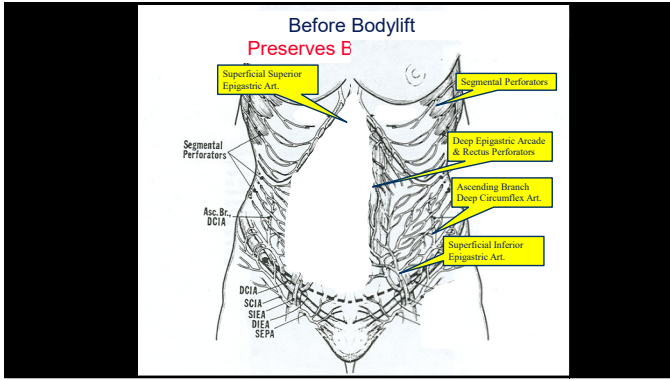
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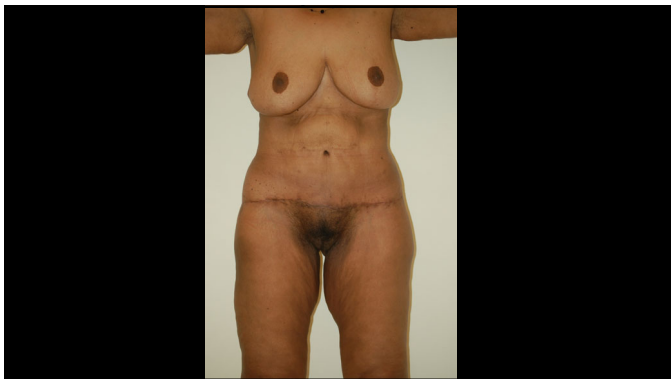
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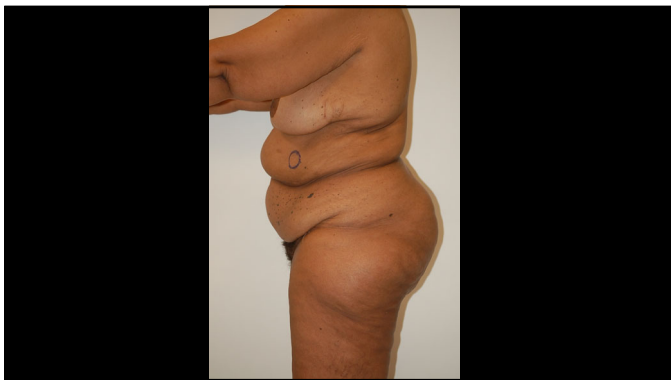
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Seven horizontal lines for handwritten notes.



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Seven horizontal lines for handwritten notes.



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Seven horizontal lines for handwritten notes.



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**Complications**

- Infection 2
- Seroma 2
- Partial necrosis umbilicus
- Dehiscence 7 minor, 1 major
  - Gastric bypass patient
  - Revision belt lipectomy 8 yrs ago
  - Only one to return to OR

Courtesy of La Belle Vie Surgery Centers

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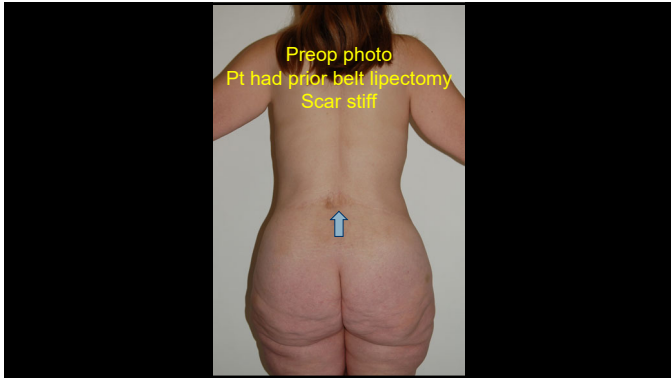
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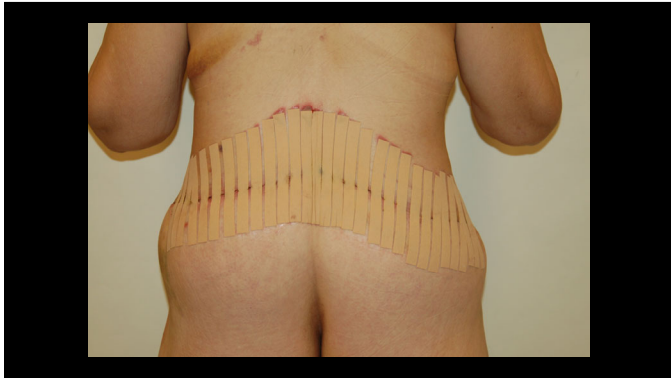
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**Lipo-Bodylift  
Summary**

- **SPEED**
  - Tumescent infiltration
  - Fat disruption: 1000 ml/min aspiration
  - Bloodless, liposuction does undermining
  - Precise pre-determined skin excision
- **SAFETY**
  - Preserves neurovascular supply
  - Extensive liposuction safe with lipo-bodylift
  - Far fewer morbidities than traditional bodylift
- **FASTER RECOVERY**
  - Outpatient procedure
  - No drains
- **SIGNIFICANT CONTRIBUTION**

Courtesy of La Belle Vie Surgery Centers.

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**Weight Loss Surgery**

Courtesy of La Belle Vie Surgery Centers.

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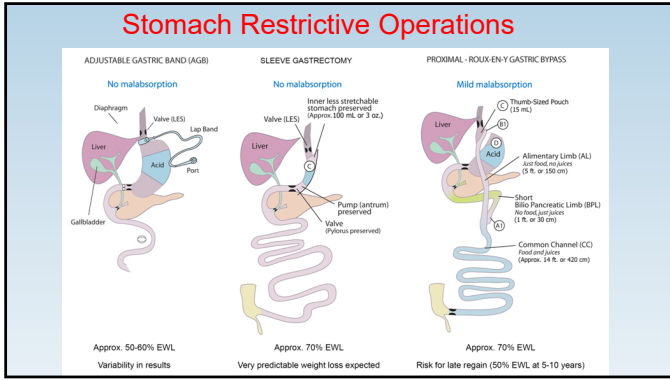
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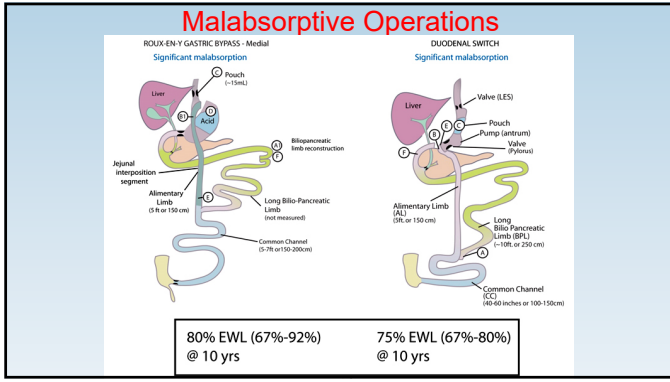
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### Weight Loss Surgery Types: Stomach Restrictive & Malabsorptive

**Distribution and tensile strength of subcutaneous fat (including the SFS) can vary depending on the type of weight loss surgery the patient has had.**

- **Stomach restrictive surgeries** – Sleeve Gastrectomy, Adjustable Gastric Band (AGB), Proximal Gastric Bypass
  - Skin and subcutaneous tissues typically normal (not thinned out)
- **Malabsorptive surgeries** – Duodenal Switch, Distal (Medial) Gastric Bypass
  - Thinner tissues, less elastic
  - Higher bleeding risk – vitamin K deficiency, 10 mg IV the night before and day of surgery or 5 mg qid for a month preceding
  - Hypoproteinemia and Hypoalbuminemia must be corrected
  - Iron deficiency: iron infusions (1g of Venofer)

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### Special Considerations for Weight Loss Surgery Patients

#### W/U Post-Bariatric Patient:

- **CMP, Mg Phos** – treat Hypoproteinemia (tp < 6.5) or Hypoalbuminemia (Alb < 3.5)
- **CBC** – investigate and treat anemia
- **Serum iron** – >100, Ferritin > 100 – if not give them IV iron (Ferricit/Venofer etc); very few side effects.
- **B 12** – shoot for levels > 600 – 1 mg sub q shots q week
- **PT/ PTT levels** – especially patients
- **Leg cramps (esp. in GBP/DS patients)** – check serum intact PTH, vitamin D, serum calcium, 24 hour urine ca – may be secondary to inadequate calcium/ vitamin D replacement. Generally we want to see vit D ~50; PTH < 60 and 24 hour ca in the 200-250 range.

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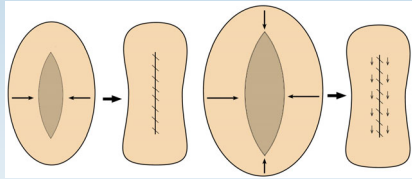
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### Abdominal Wall Plication Principles

Goal is to correct abdominal girth in the horizontal and vertical directions to restore abdominal wall function (e.g. correct back problems)



Hunstad, Joseph P., and Remus Repta. Atlas of Abdominoplasty. Philadelphia: Saunders/Elsevier, 2009. Pg. Pg. 151, Fig. 12.26 - 12.30 Toronto RR. R. Evolution of back pain with the wide abdominal rectus plication abdominoplasty. Plast Reconstr Surg. 1988; 81 : 777

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### Abdominal Wall Musculo-Aponeurotic Reconstruction Techniques

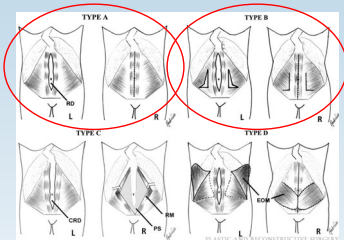


Fig. 2. Types of abdominal deformity and their correction. Type A, rectus diastasis secondary to pregnancy; correction is by plication of the anterior rectus sheath. Type B, rectus diastasis with fatty of the musculoaponeurotic layer; correction by plication of the anterior rectus sheath and external oblique aponeurosis. Type C, congenital lateral insertion of the rectus abdominis at the costal margin and probable hernias. Correction by undermining the posterior rectus sheath, invagination of the linea alba, and anchoring the anterior rectus sheath to the midline. Type D, rectus diastasis and poor venal drainage. Correction is accomplished by anterior rectus sheath plication and medial advancement of the external oblique muscles. (Reprinted from Nahas, F. X. An aesthetic classification of the abdomen based on the myoaponeurotic layer. Plast. Reconstr. Surg. 108: 1787, 2002.)

Abdominoplasty. Friedland, Jack A., Maffi, Terry R. Plastic and Reconstructive Surgery. 121(4):1-11, April 2008. doi: 10.1097/PRS.0b00363e8130260

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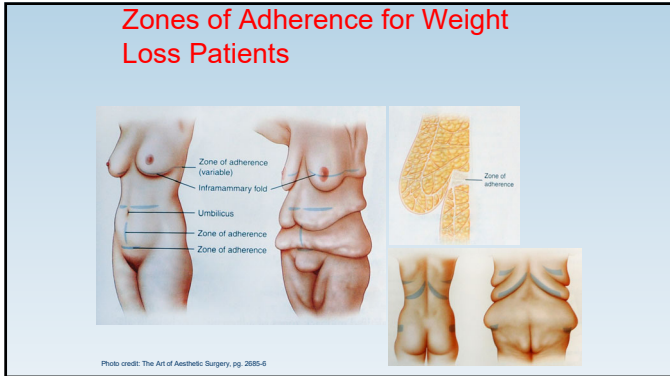
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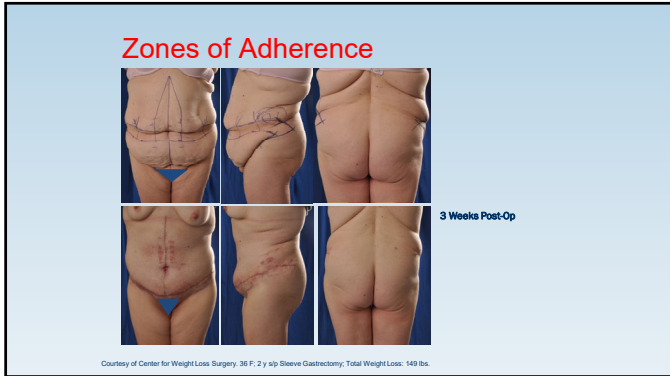
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**Cosmetic & Body Contouring Options**

- Standard Abdominoplasty – conventional vs. lipo-abdominoplasty technique
- Bilateral Gluteal & Thigh Lift
- Fleur-de-Lis Abdominoplasty (w/ Thigh Lift)
- Circumferential Abdominoplasty (conventional vs. lipo-abdominoplasty)
  - Anterior Abdominoplasty
  - Bilateral Thigh Lift
  - Gluteal Lift
- Circumferential Fleur-de-Lis Abdominoplasty (w/ Bilateral Gluteal & Thigh Lift)

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**Medical Necessity**

1. Relief from **lower back pain** from the large and heavy pannus.
2. Correction of **severe abdominal wall muscle deformities** which have been stretched by years of obesity.
3. Removal of areas of **Intertriginous Dermatitis** (rashes) which causes areas of inflammation and foul smell in the folds due to overhanging skin.
4. Improvement of **pelvic hygiene**.

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**Extended Abdominoplasty in a Weight Loss Surgery Patient**  
Using Lipo-Abdominoplasty Technique (Avelar)

Extended incision line for Abdominoplasty in weight loss surgery patients.

Courtesy of Center for Weight Loss Surgery - 43 F, 6 y lip Proximal Gastric Bypass, Total Weight Loss: 73.6 lbs.

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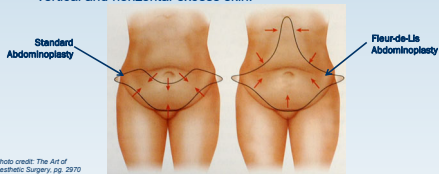
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### Fleur-de-Lis Abdominoplasty

Massive weight loss patients are often left with significant midline abdominal fullness. This is usually addressed best with the Fleur-de-Lis approach.

- The vertical & horizontal incision (inverted T) addresses both vertical and horizontal excess skin.



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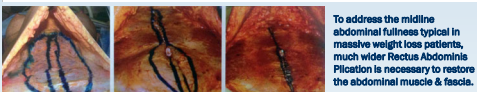
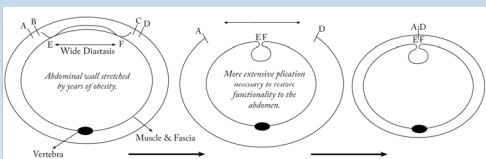
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### Wide Rectus Abdominis Plication (WRAP)



Toronto RI. R resolution of back pain with the wide abdominal rectus plication abdominoplasty. Plast Reconstr Surg. 1989; 81: 777.  
 Photo credit: Body Contouring After Massive Weight Loss, pg. 200

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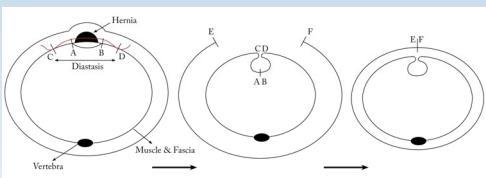
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### Wide Rectus Abdominis Plication with Hernia Repair

- Avoids use of mesh - could lead to bowel adhesions and fistula formation



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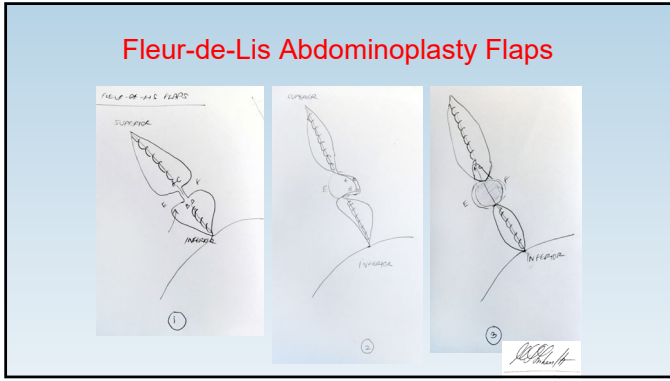
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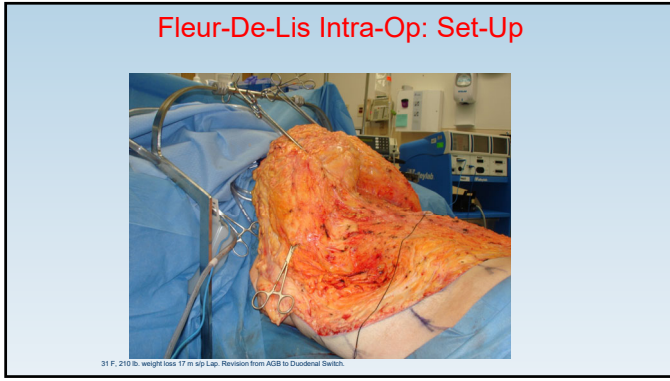
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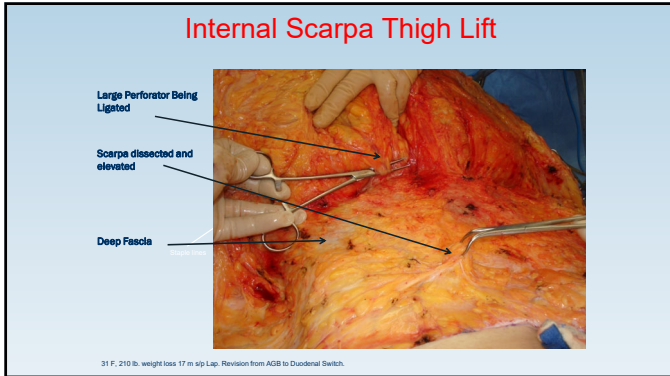
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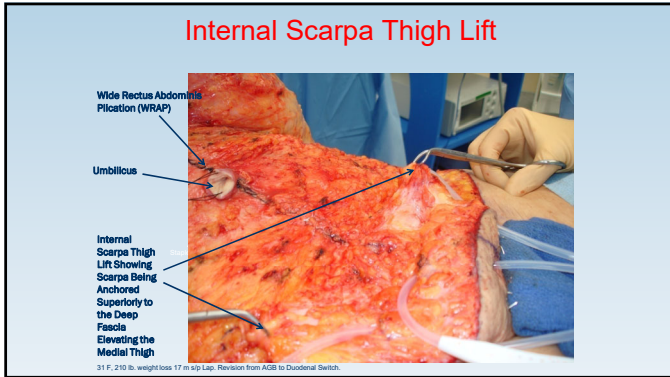
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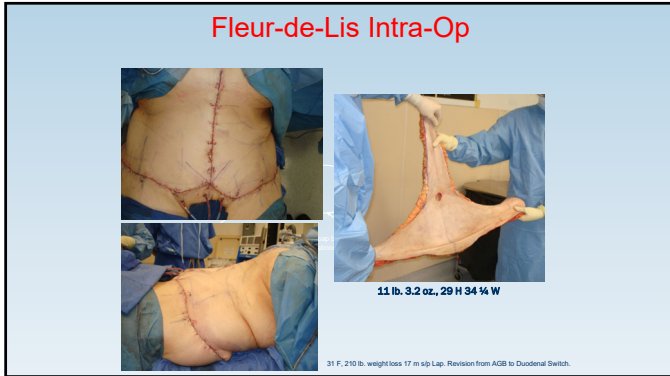
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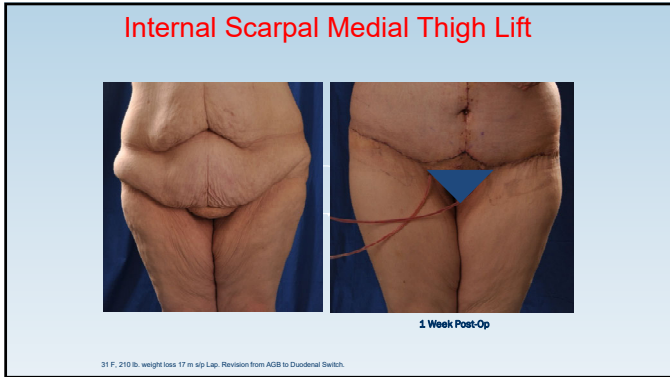
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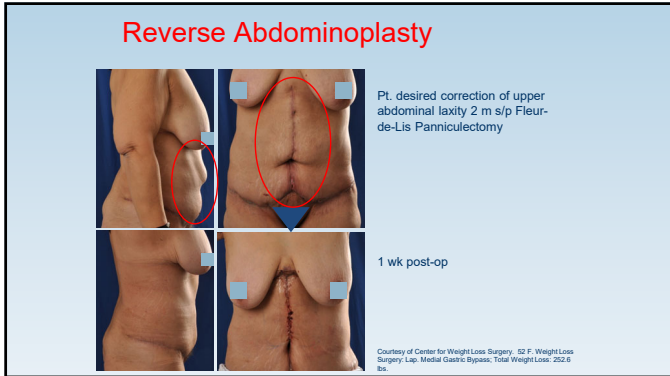
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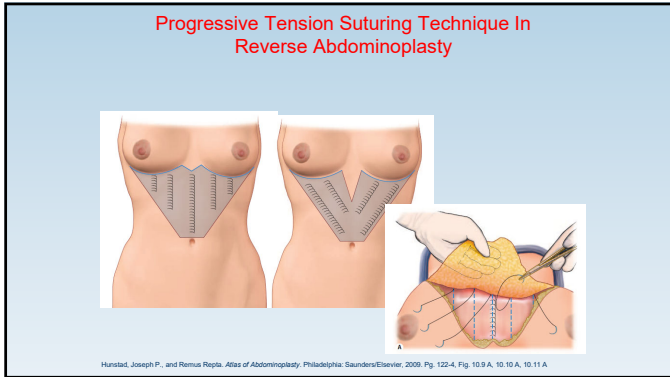
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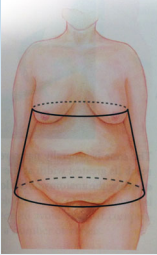
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### Lower Trunk Deformity After Massive Weight Loss



Weight loss surgery patients typically have:

- Loose, overhanging skin around their entire body
- Collapsed, cone-shaped deformity

**A circumferential approach is a safe and effective single-stage alternative that results in dramatic improvement**

Photo credit: Body Contouring After Massive Weight Loss, Pg. 79

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### Example: Lower Trunk Deformity After Massive Weight Loss



Courtesy of Center for Weight Loss Surgery, Weight Loss Surgery: Medial Gastric Bypass, Total Weight Loss: 142.8 lbs.

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### Circumferential Abdominoplasty

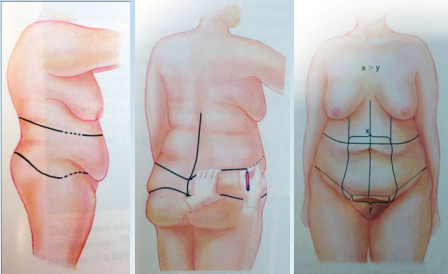


Photo credit: Body Contouring After Massive Weight Loss, pg. 99-100

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**Circumferential Abdominoplasty:  
Three Part Procedure**

Most efficient way to address excess skin that extends around the entire body.

Front      Back      Side

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**Circumferential Operation**

Anterior Standard Abdominoplasty, Conventional Technique

Courtesy of Center for Weight Loss Surgery, 32 F, 1.1 5 m slip Proximal Gastric Bypass, Total Weight Loss: 126.5 lbs.

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**Circumferential Operation**

Anterior Standard Abdominoplasty Using Lipo-Abdominoplasty (Avelar Technique)

An advantage of this technique is that no drains are necessary.

Post-op infected (E.coli) seroma 2 wks a/p. Normal WBC count resolved with drainage and antibiotics; pt. had simultaneous Lap. Cholecystectomy.

Courtesy of Center for Weight Loss Surgery, 42 F, 8 months slip Proximal Gastric Bypass, Total Weight Loss: 116.4 lbs.

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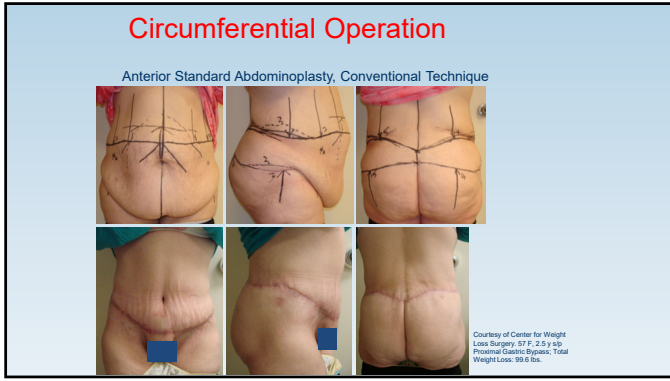
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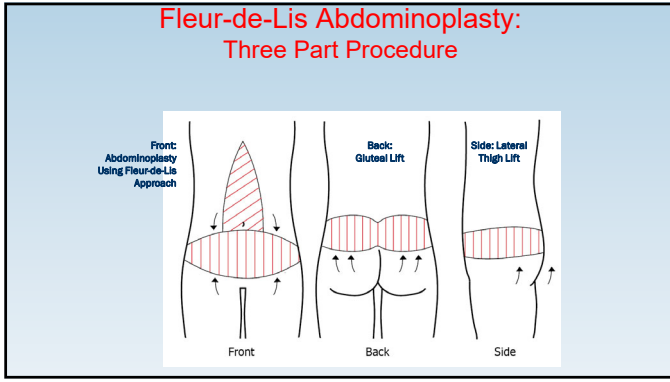
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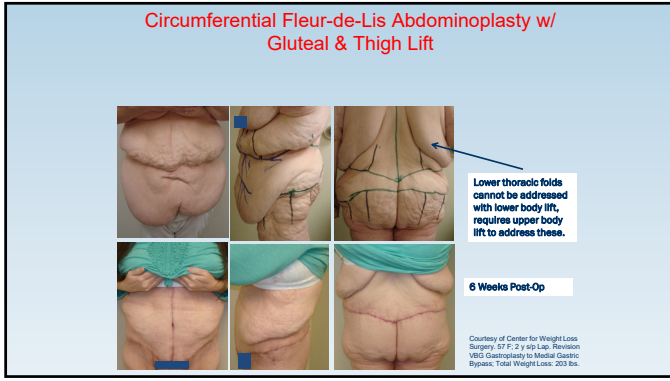
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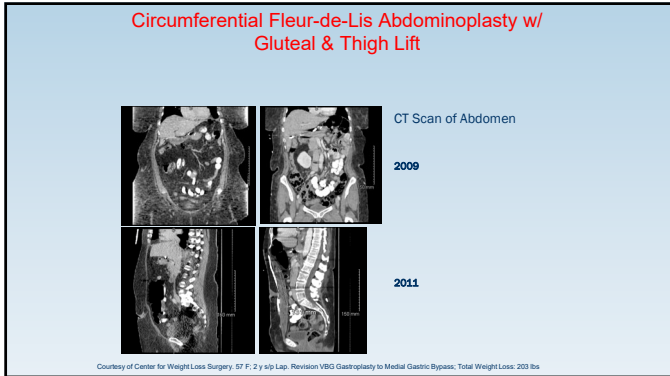
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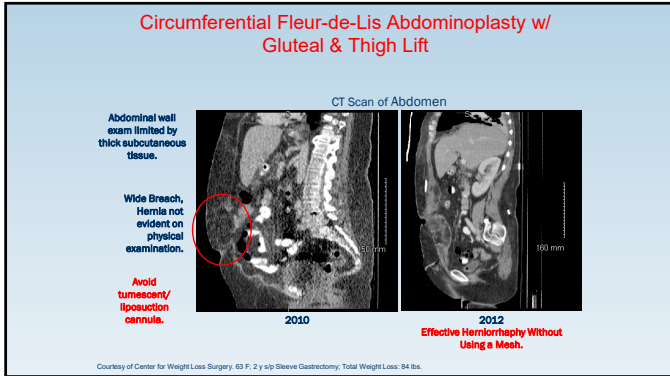
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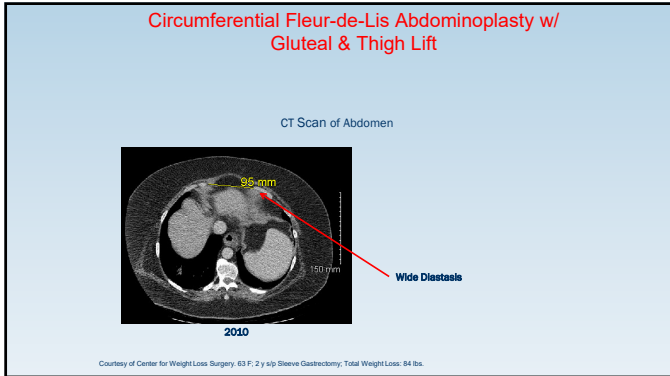
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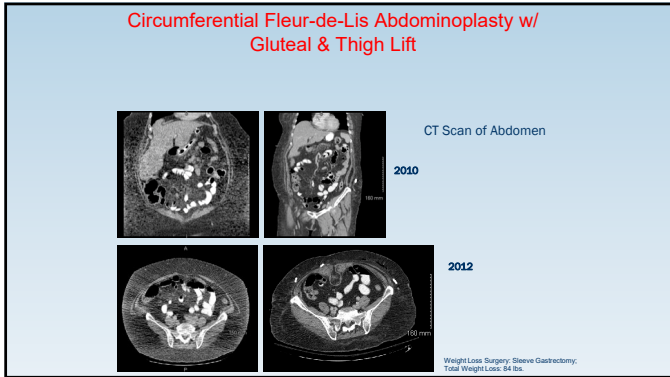
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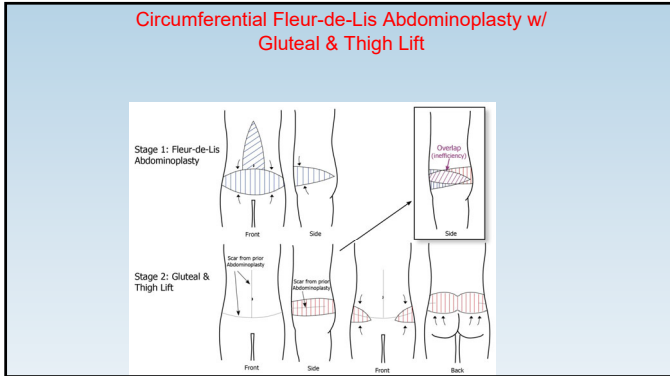
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### Inefficiency of Staged Procedures

- Fleur-de-Lis Abdominoplasty followed by Gluteal & Thigh Lift
- More efficient to perform a circumferential operation, as much as 10° of overlap



Courtesy of Center for Weight Loss Surgery, 50 F, 2 y s/p Medial Gastric Bypass; Total Weight Loss: 202 lbs.

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### Morbidity From A Lower Trunk Deformity in Bariatric Patients BMI >40



**Medical necessity:**  
Lower back pain,  
Intertriginous  
Dermatitis (rashes),  
pelvic hygiene.

Courtesy of Center for Weight Loss Surgery, 67 F, 6 y s/p Adjustable Gastric Band; Total Weight Loss: 110 lbs. (BMI 44.2)

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### Morbidity From A Lower Trunk Deformity in Bariatric Patients BMI >40



**Removed 23 lbs. 3.6 oz. from pannus**

Courtesy of Center for Weight Loss Surgery, 67 F, 6 y s/p Adjustable Gastric Band; Total Weight Loss: 110 lbs. (BMI 44.2)

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**Case Study**

Deflated skin lower trunk, buttocks, lateral thigh, posterior folds.



Plan: Lipo Body Lift

41 F, 130 lb, weight loss s/p Lap, Proximal Gastric Bypass

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**Case Study**

Lipo Body Lift



Removed 14.2 lbs.; Fat Aspirate 1,700 mL

Day 1 Post-Op, posterior folds have been corrected

41 F, 130 lb, weight loss s/p Lap, Proximal Gastric Bypass

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**Case Study**

Lipo Body Lift



Correction of lower posterior fold using the Mangubat Angulated Underminer

2 Months Post-Op

41 F, 130 lb, weight loss s/p Lap, Proximal Gastric Bypass

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### Body Contouring after Massive Weight Loss

- Limit surgery to 6 hrs
- Avoid too much surgery at one time
- Results correlate with BMI. Esp BMI >35.
- These pts can develop neurological problems even without an abnormal position
- Emphasize:
  - Improve contour not skin quality!
  - May take 4-6 wks to recover
  - May take 1-2 yrs for results to stabilize

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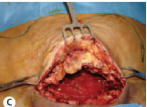
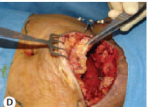
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### Complications

- Seroma
- Hematoma – drains may clog up
- “Fainting/Dizziness” post-op
- DVT/PE
- Dog ears
- Fat Necrosis – Cellulitis not responding to antibiotics – “Firmness” – may need debridement

Hurstad, Joseph F., and Remus Rosta. Atlas of Abdominoplasty. Philadelphia: Saunders/Elsevier, 2009. Pg. 122-4. Fig. 10.9 A, 10.10 A, 10.11 A

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### Complications

- Heavy smoker, malabsorptive operation, prior history of skin loss s/p Fleur-de-Lis Panniculectomy
- Gluteal auto augmentation increases risk for skin loss

3 Weeks Post-Op

Courtesy of Center for Weight Loss Surgery, 60 F. 2 y s/p Medial Gastric Bypass, Total Weight Loss: 232 lbs.

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### Outpatient Body Contouring Operations in Massive Weight Loss Patients

- Crew experienced and trained in body contouring operations after massive weight loss
- Efficient position changes (two positions, prone and supine)
- Lipo-Abdominoplasty technique (Avelar)
- VASER technology
- Experienced co-surgeon
- Experienced anesthesia

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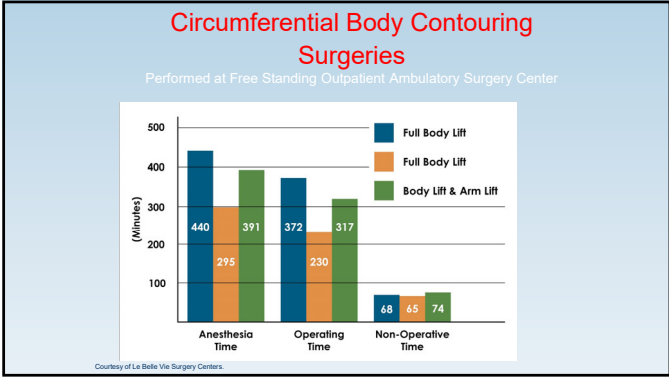
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### Outcomes

#### Complication Rate

	National Data		Our Data	
	Type 2 (n=67)	Type 3 (n=47)	Abdominoplasty (n=177)	Circumferential (n=7)
Wound Dehiscence	29.85%	31.91%	1.7%	0%
Skin Necrosis	5.97%	8.51%	1.7%	0%
Bleeding	2.99%	6.38%	4.5%	0%
Pulmonary Embolism (PE)	1.49%	2.13%	1.1%	0%
Overall Complication Rate	44.78%	61.7%	9%	0%
Length of Stay (LOS)	3.06 days	3.77 days	2001-2008: 2 days 2008-2013: 1 day	

1 patient developed skin necrosis after two-stage circumferential operation (smoker)

National data from: Capella Body Lift After Massive Weight Loss, Vol 117, No. 2, Pg. 419

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### Outcomes

#### Complication Rate

	National Data		Our Data	
	Normal Weight (n=56)	Obese - BMI >30 (n=60)	Abdomino-plasty (n=177)	Circumferential (n=7)
Wound Dehiscence	4.5%	31.91%	1.7%	0 %
Skin Necrosis	5.3%	8.51%	1.7%	0 %
Pulmonary Embolism (PE)	0%	2.13%	1.1%	0%
Overall Complication Rate	28.6%	53.4%	9%	0%

1 patient developed skin necrosis after two-stage circumferential operation (smoker)

National data from: Lippincott, Williams & Wilkins, Annals of Plastic Surgery, Vol. 58, No. 3, March 2007

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### Case Study

Patient presents with 80 lb. weight loss after bariatric surgery 5 years ago for body contouring.

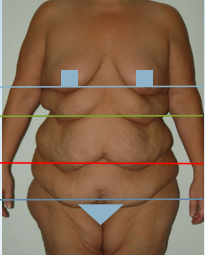
**Zones of Adherence**

Breast Fold

Scapular Fold

Lower Thoracic Fold

Hip Fold



Upper Abdominal Fold

Waist Band of Adherence

Pannus

Courtesy of La Belle Vie Surgery Centers.

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170

### Case Study

Patient presents with 80 lb. weight loss after bariatric surgery 5 years ago for body contouring.

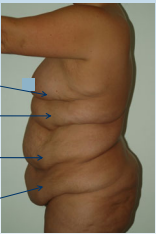
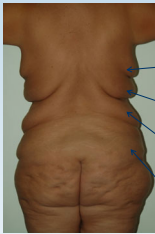
**Zones of Adherence**

Breast Fold

Scapular Fold

Lower Thoracic Fold

Hip Fold

Breast Fold

Scapular Fold

Lower Thoracic Fold

Hip Fold

Courtesy of La Belle Vie Surgery Centers.

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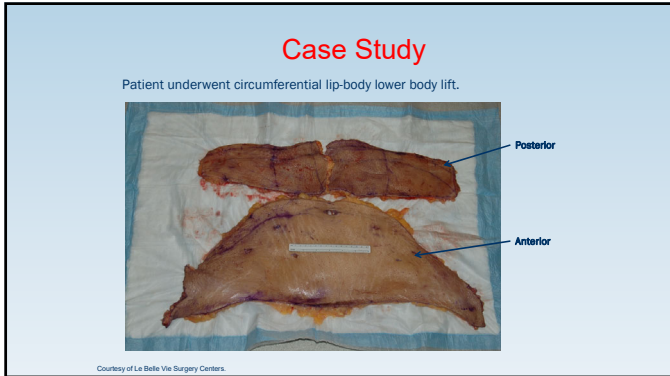
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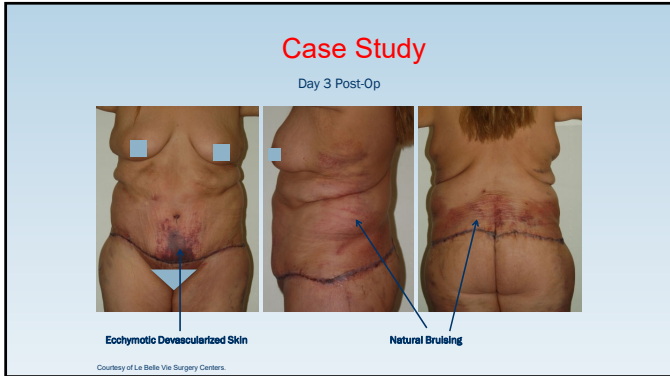
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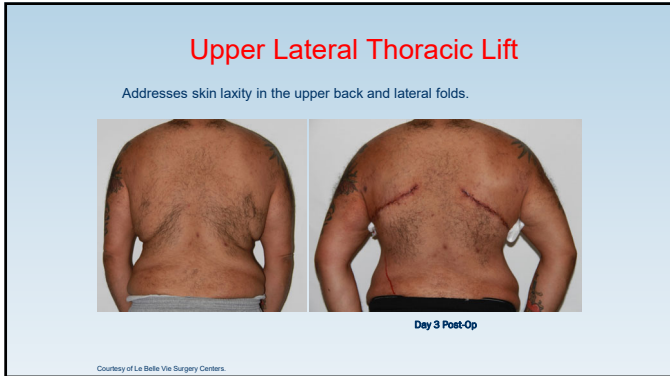
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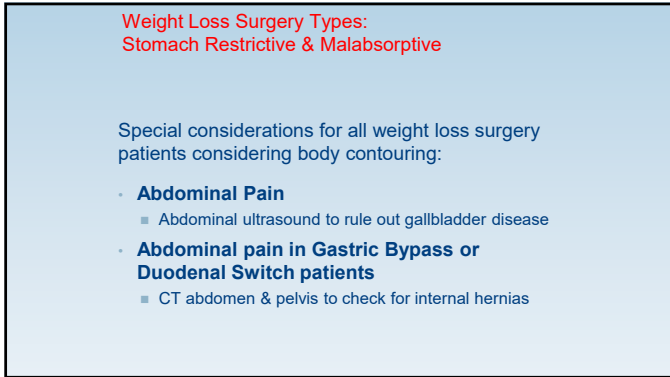
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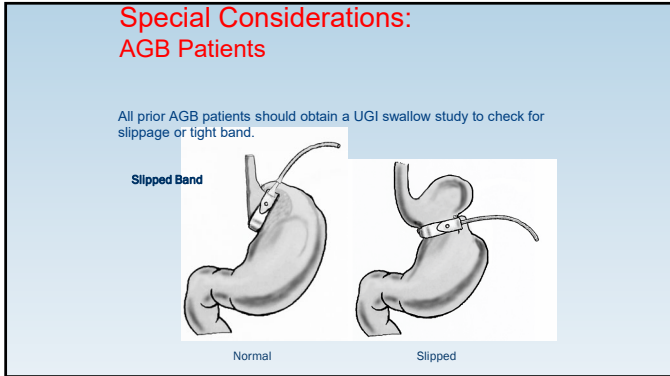
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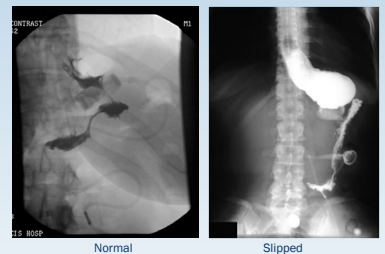
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### Slipped Band

All prior AGB patients should obtain a UGI swallow study to check for slippage or tight band.



Normal Slipped

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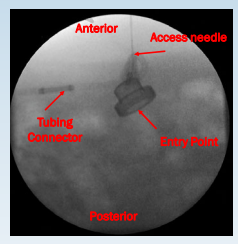
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### Special Considerations: AGB Patients

Type of AGB port – be careful using a vaser over these, probe may shatter.



Not uncommon to have port problems such as a flipped port. This can be addressed during abdominoplasty.

Flipped Port

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### AGB Tube Problems: Stress Fracture From Acute Angulation



Want smooth angle when anchoring port into the abdominal cavity  
If port is at an acute angle it could cause stress fracture in tubing.

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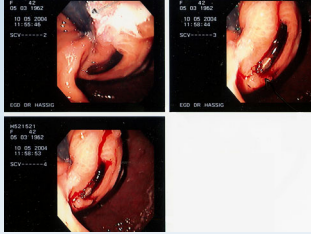
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**Special Considerations: AGB Patients**

Any unexplained anemia in an AGB patient is band erosion until proven otherwise. Must be investigated by a UGI endoscopy, preferable by the bariatric surgeon.



**Eroded Band**

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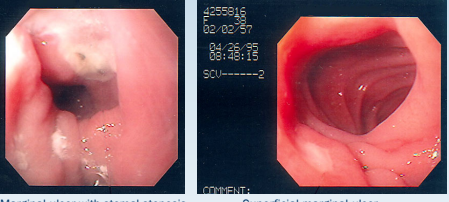
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**Special Considerations: Gastric Bypass Patients**

Any unexplained anemia in a gastric bypass patient requires an endoscopy to check for marginal ulcers.



Marginal ulcer with stomal stenosis      Superficial marginal ulcer

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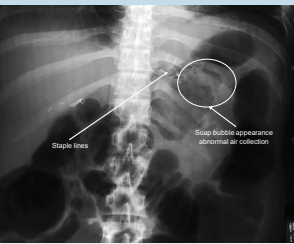
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**Weight Loss Surgery Patients: No Blind NG Tube Placement**



36-year-old female

- 2 years s/p Gastric Bypass
- 184 lb. weight loss

8 days later

- VS – Temp 100.3, HR 106, BP 167/102, RR 20, Sat 100%
- WBC 11.2, Hb/Hct 11.5/33

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**Abdominoplasty and Body Lift Summary**

- Safety first
  - Big procedures require preparation
  - Healthy patients
  - Speed and technical abilities critical to success
- Vigilance
  - Postoperative complications more common
  - Recognize pending problems
  - Early recognition with early intervention
- Avelar concept proven to be useful
  - Decreased OR time
  - Decreased complications
  - Useful for bodylifting
- Massive weight loss patients
  - Require full work up as their problems are unique and often unexpected
  - Nutritional workup essential preop

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**Thank You!**

**Body Contouring After Massive Weight Loss:  
Abdominoplasty & Body Lift**

**E. Antonio Mangubat, MD**  
Seattle, WA

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