

# Mesh-like External Suture Splint: A Way to Improve Results and Reduce Postoperative Complications after High-definition Liposculpture

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**Summary:** High-definition liposculpture with variable degrees of muscular definition allows both patients and surgeons to broaden the procedure to fit almost any individual preferences; however, skin laxity and those secondary cases still represent a big challenge for the surgeon to achieve optimal outcomes. We are reporting our experience with a new suture-splint procedure to reduce edema, avoid skin laxity, and increase muscular definition after liposculpture. We enrolled patients undergoing HDL with any risk factor that could compromise aesthetic outcomes. Tumescence technique with VASER fat emulsification and power-assisted liposuction were used to complete HDL. We performed a continuous suture over the midline and other areas of muscular definition right before patients awakened from anesthesia. Real-time ultrasound imaging was performed to ensure the safety of the procedure. A total of 52 consecutive patients were treated with MesHD in our study. Only two patients voluntarily dropped off from postoperative analysis due to geographical limitations. Postoperative edema was referred by only one patient after surgery. No major complications were reported. Three patients complained of stabbing pain over one of the stitches, which resolved completely after suture removal. All patients were satisfied with postoperative results. Mesh suture-splint at body areas with high risk of adverse effects after body contouring surgery may be an effective procedure to improve recovery by decreasing edema formation, enhancing muscular definition, decreasing risk of fibrosis, and avoiding skin laxity postoperative appearance. (*Plast Reconstr Surg Glob Open* 2024; 12:e5958; doi: 10.1097/GOX.0000000000005958; Published online 10 July 2024.)

## INTRODUCTION

In 2021, liposuction was the most common aesthetic surgical procedure performed worldwide, with a total of 1,90,063 procedures and a 24.8% increase compared with 2020.<sup>1</sup> Some common complications after liposculpture include hematoma and seroma. The literature reports an incidence of 0.05% to 0.32% and 2.69% to 9.27%, respectively.<sup>2,3</sup> Such postoperative problems lead to over-stretched skin, pain, and prolonged recovery time. In fact,

sometimes they end up requiring active drainage either by puncture or new procedures. This further delays time to return to basic activities and may impair the outcome. In 2012, Auersvald described the benefits of a percutaneous hemostatic mesh that reduced complications after rhytidoplasty.<sup>4,5</sup> We aimed to describe our experience with an equivalent-design net but extrapolated to high-definition lipoplasty (HDL).

## METHODS

Patients were voluntarily enrolled in our study. All of them underwent HDL and were operated on between January 2023 and September 2023. Inclusion criteria included adult patients between 18 and 60 years who had certain risk factors that could compromise the outcomes after HDL, such as nonprimary surgery, high risk of hematoma formation (thin skin, history of easy bruising, controlled autoimmune

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disease, etc.), moderate skin laxity, and those undergoing Xtreme muscular definition but presenting with modest muscular volume (flat pectoralis major, low projection of rectus abdominis bellies, etc.). All patients were operated on by the senior author at the same location (Dhara Clinic, Bogota, Colombia). Exclusion criteria included patients with healing or bleeding disorders, body mass index greater than or equal to 30 kg/m<sup>2</sup>, ASA grade greater than or equal to III, and Caprini score greater than or equal to 5. Our study was approved by the research ethics committee of Dhara Clinic in December 2022. Patients were informed of the purpose, methods, experimental technique, potential risks and benefits specific to the procedure, and any possible conflicts of interest and institutional affiliations of the authors according to the Declaration of Helsinki. They were also informed of the right to refuse to participate in the study or to withdraw consent to participate at any time without reprisal. A freely given informed consent was signed for each patient participating in our report.

**Surgery**

All patients underwent combined general anesthesia (intravenous + inhaled). Intravenous cephazolin (1g) and tranexamic acid (1g) were given during induction. HDL was done as a three-step procedure: infiltration, emulsification, and liposuction.<sup>6,7</sup> Liposuction was done using both VASER (Solta Medical—Bausch Health Companies Inc., Bothell, Wash.) and MicroAire (MicroAire Surgical Instruments, LLC, Charlottesville, Va.). Once it was

**Takeaways**

**Question:** Is there a way to prevent the sad umbilicus and/or sagging skin after high-definition liposculpture? Are there any other methods rather than compression garments to improve skin retraction after lipoplasty?

**Findings:** We are reporting a case series of 52 consecutive individuals who underwent high-definition liposculpture and a mesh-like external suture splint to reduce postoperative edema, bruising and improve postoperative skin retraction over muscular definition zones.

**Meaning:** Use of a mesh-like skin suture immediately after high-definition liposculpture showed an improvement of the muscular definition and reduced the complications in patients with certain risk factors for loose skin, seroma, bruising, and fibrosis among others.

completed, a continuous suture was done to obliterate the dead space generated during the crossing of the cannula in the subcutaneous layer (MesHD). We used Polypropylene 2-0 with FS 26mm needle. A hemostatic net was assembled starting at the midline just above the navel. [See Video 1 (online), which displays an intraoperative demonstration of MesHD in a man who underwent HDL and had a mild risk of Umbilicus hooding. Then you will see a 38-year-old man who underwent Xtreme definition HDL. The patient had thin skin and history of easy bruising, which put him at high risk for postoperative hematoma/seroma formation

**Table 1. Patient Demographics**

n = 51	Male		Female			
	n = 38 (74.5%)	Avg	Range	n = 13 (24.5%)	Avg	Range
Age		39	23–58		34	27–52
Weight (kg)		68	60–84		56	48–71
Height (m)		170	160–186		158	152–170
Body mass index (kg/m <sup>2</sup> )		23.4	23.5–25.6		22.5	20.8–24.5
<b>Risk factors</b>	<b>n (%)</b>			<b>n (%)</b>		
Secondary surgery	8 (21%)			11 (84%)		
≥3 prior surgeries	1 (3%)			5 (38%)		
Thin skin	10 (26%)			7 (54%)		
History of easy bruising	2 (5%)			4 (31%)		
History of autoimmune Ds	0 (0%)			2 (15%)		
Moderate skin laxity	3 (21%)			3 (23%)		
Xtreme definition	26 (68%)			7 (54%)		
Modest muscular mass	12 (32%)			6 (46%)		
<b>Surgery</b>		<b>Volume (mL)</b>			<b>Volume (mL)</b>	
Infiltration		5700	3800–8200		4600	3100–7800
Lipoaspirate		4700	3200–7800		3400	2400–8000
Fat grafting	36 (95%)	120	50–300	10 (77%)	250	200–600
<b>Complications</b>	<b>n (%)</b>			<b>n (%)</b>		
Prolonged bruising	1 (2.6%)			0 (0%)		
Prolonged edema	0 (0%)			0 (0%)		
Sad umbilicus	0 (0%)			0 (0%)		
Fibrosis (6-months postoperative)	0 (0%)			0 (0%)		
Asymmetry	0 (0%)			0 (0%)		
Infection	0 (0%)			0 (0%)		
Loose skin	0 (0%)			0 (0%)		
Hematoma	0 (0%)			0 (0%)		
Necrosis	0 (0%)			0 (0%)		

and/or skin laxity. MesHD successfully improved skin adhesion and prevented fibrosis formation, as shown in the 6-months postoperative follow-up photograph.]

Needle passage followed a uniform pattern, transfixing perpendicular to the skin, plunging into the deep fascia at 45 degrees, and emerging at the same angle at a distance of 0.8–1 cm between stitches. Such spacing and mild traction of the thread (driven by the assistant) ensured tightness and symmetry. Deep fascia was brought up in contact with the skin, thereby closing the dead space. The midline was covered from the navel to the xiphoid and then at the horizontal transcriptions of the rectus abdominis muscle. Sutures over the lateral border of the pectoral muscles, linea alba, and posterior torso could also be done in selected cases. We placed Blake closed drainage systems (Ethicon, Inc., Johnson & Johnson, New Brunswick, N.J.) at the subcutaneous space through the inguinal incisions. Patients were left for overnight observation. Postoperative laboratories were drawn 12–24 hours after surgery; early mobilization and physical/respiratory therapy started 3–6 hours after surgery. The hemostatic net was removed 48–72 hours after surgery. Chemoprophylaxis with enoxaparin (40 mg SQ/d) was given perioperatively based on Caprini score.<sup>8</sup> Photographic records were done preoperatively; intraoperatively; and 24–48 hours, 1 week, 1–3 months, and 6 months after

surgery. Postoperative compression garments and foam vests are mandatory for all patients, for 8–10 weeks after surgery.

## RESULTS

MesHD was successfully completed in a total of 51 consecutive procedures. Most of them were men ( $n = 38$ ). Age ranged from 23 to 58, and 27 to 52 in men and women, respectively. Only one patient complained about prolonged bruising around the stitches; however, the surgeon considered it was probably due to the high risk of hematoma formation, rather than due to the stitches themselves. No other complications were reported (Table 1). Patients were followed up to 6 months postoperative; no hyperpigmentation nor scars were associated with MesHD (Fig. 1). Both the surgeon and the patient were satisfied with the postoperative outcomes. [See figure, Supplemental Digital Content 1, which displays a 27-year-old woman who underwent moderate definition HDL. Preoperative photograph (A) shows a woman with a mid-to-low umbilicus and poor muscular volume. She had a high risk of developing postoperative umbilicus hooding; therefore, we used a midline MesHD (B). The early 1-week postoperative photograph (C) shows a still-swollen body with a better definition of the midline. Now, the 2-months postoperative photograph



**Fig. 1.** A 38-year-old man who underwent Xtreme definition HDL. A, Preoperative photograph of the patient with poor muscular volume. Also, he had thin skin and a history of easy bruising. B, Three-months postoperative photograph of the patient with improved muscular definition, and a natural-looking abdomen, without scars or any other hint of MesHD.

(D) shows a woman with a slim and athletic abdomen, an anatomical midline definition with no umbilicus hooding. <http://links.lww.com/PRSGO/D338>.]

## DISCUSSION

Fibrosis and postoperative skin laxity after body contouring procedures are still a big concern among patients undergoing HDL.<sup>9,10</sup> In effect, they are usually complications that go unnoticed due to the usual success of the overall result after HDL.<sup>6</sup> We came up with the idea to use a net to improve the results after HDL, based on the remarkable findings by Auersvald.<sup>4,5</sup> To our surprise, we found that MesHD was remarkably effective in preventing edema and/or hematoma formation in those patients with additional risk factors for skin laxity, and postoperative complications (Table 1). Of note, patients had a faster recovery compared with others who underwent similar procedures that we have done before; however, we are currently working on data for a cohort study to properly address and support these findings. Our preliminary results also show that many patients can present, at the same time, with other risk factors for lack of muscle definition, umbilical hooding, mild skin laxity, and/or early fibrosis formation (abnormal scarring). Certainly, they may go unnoticed and should be considered in preoperative evaluation as potential modifiers of the outcomes. Although it might be perceived as a little aggressive, the suturing technique has not been associated with hyperpigmentation or scar formation after 6 months of follow-up; however, long-term follow-up studies might be required to support our conclusions. Above all, the technique is easy to reproduce and fast enough to perform intraoperatively once its principles and basics have been learned and practiced. Ultrasound imaging can be used as a safety measure to ensure the proper layer location of the suture. Our study is informative and intends to showcase a technique that might be helpful for many surgeons performing HDL; however, the small sample size and the lack of inferential statistics are both limitations of our report. We look forward to collaborating with other surgeons around the world to provide better evidence-based studies on these matters.

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## DISCLOSURES

*Dr. Hoyos is a speaker for INMODE, and receives royalties, compensation, and sponsorships from it. All the other authors have no financial interest to declare in relation to the content of this article.*

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