High-Definition Liposculpture 18-Year Evolution: Patient Safety and Aesthetic Outcomes

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Background: High-definition liposculpture (HDL) emerged as an innovative surgical technique that allowed plastic surgeons to achieve improved aesthetic results with a natural and athletic appearance using minimal incisions and with imperceptible scarring. Its targets are high aesthetic standards and patient safety.

Purpose: This article summarizes the evolution of HDL by explaining upgrades to the original technique and comparing the complication rates among them.

Methods: The authors retrospectively reviewed records from four private medical centers (Evolution Medical Center, Santa Barbara Medical Center, and Dhara Clinic in Bogota and FOSCAL in Bucaramanga, Colombia) of patients who underwent HDL performed by the senior author (A.E.H) over an 18-year period (2002 through 2019). Patients were classified into three groups: suction-assisted lipoplasty (period 1), vibration amplification of sound energy at resonance–assisted HDL (period 2), and dynamic definition liposculpture (period 3).

Results: The authors established a cohort of 5052 patients (4300 women and 752 men): 923 in period 1, 1272 in period 2, and 2857 in period 3. The most common complications included seroma, bruising, hematoma, acute anemia, hyperchromia, wrinkled skin, wound dehiscence, and local infections.

Conclusions: HDL and dynamic-definition liposculpture procedures are safe and reproducible techniques to achieve an athletic and natural body contour. Complication rates, especially those related to bleeding, decreased as the technique evolved. These procedures are aimed toward patient safety to provide higher aesthetic outcomes using extensive medical, anatomic, artistic, and technological knowledge. *(Plast. Reconstr. Surg.* 151: 737, 2023.)

CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, III.

Nowadays, every plastic surgeon has read or heard about high-definition liposculpture (HDL), and some have been trained on the technique specifics, which demonstrate that improved aesthetic outcomes can be achieved through minimal incisions without body scarring.[1] The senior author (A.E.H.) first explained HDL in 2002 during plastic surgery meetings and then popularized it in the first journal publication in 2007.[1,2]

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The technique has evolved throughout the past 18 years with several improvements and the addition of new technologies that ease the surgical procedure and increase patient safety. HDL is an amalgamation of technologies and anatomic and artistic concepts based on patient safety and sophisticated aesthetic outcomes. The usual candidate for traditional liposuction was the patient who was overweight or obese, but HDL changed the target population to a younger, slimmer, and more demanding population than that seen with other liposuction techniques, which reinforces the concept that HDL is more about revealing rather than just removing.

We have published the results and advances in HDL with the most important of its upgrades, dynamic definition liposculpture (4D Lipo),[3–5] but no comparison among them is available. This article compares the rates of common complications and improvements in patient safety among the current and preceding HDL techniques.

PATIENTS AND METHODS

We conducted a retrospective review of our records regarding HDL surgery. Three private plastic surgery centers in Bogota, Colombia (Evolution Medical Center, Santa Barbara Medical Center, and Dhara Clinic) and one in Bucaramanga, Santander (FOSCAL) provided information on patients who underwent any of the HDL procedures over an 18-year period (2002 through 2019).

Patients were classified into one of the following three groups of procedures: suction-assisted lipoplasty (SAL), vibration amplification of sound energy at resonance (VASER)–assisted HDL, or dynamic definition liposculpture. Complication rates and other variables were analyzed per group. Demographic and clinical characteristics are shown in Table 1.

A Video Discussion by Simeon Wall, MD, accompanies this article. Go to PRSJournal.com and click on "Video Discussions" in the "Digital Media" tab to watch.

Ethical Considerations

Each patient was informed of the purpose, methods, sources of funding, any possible conflicts of interest, institutional affiliations of the authors, the anticipated benefits and potential risks of the study and the discomfort it may entail, poststudy provisions, and outcomes according to the Helsinki Declaration. 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 study.

Statistical Analysis

Descriptive analysis was made through means and medians according to the distribution of variables. For categorical variables, counts and percentages were used. The quantitative variables were compared using *t* test or Mann-Whitney *U* test for nonparametric variables and the frequencies of the qualitative variables were compared using the chi-square test. Bilateral hypotheses were formulated at two tails with significance level less than 0.05. Data were analyzed using STATA version 15 software.

SURGICAL TECHNIQUES

Suction-Assisted Lipoplasty (2002 through 2005)

HDL initially was performed with the aid of continuous suction devices, which generated a constant negative pressure that eased fat extraction (without prior emulsification), but the procedure itself was as traumatic as conventional liposuction. The prolonged exposure of negative pressure upon tissues was relatively contraindicated and if applied near the skin, contour irregularities, cutis marmorata, skin necrosis, and scarring could occur.[6–8] Patients with obesity and those with previous liposuction procedures were considered poor candidates for suction-assisted HDL. Although results were good, the surgery was arduous and required great physical effort by the surgical team (with an average surgical time ≈2 hours), and was traumatic and painful for the patient. [**See Figure, Supplemental Digital Content 1**, which shows a 38-year-old man of normal weight (*left*) who underwent SAL. The postoperative photograph (*right*) shows a more athletic and muscular appearance, ***http://links.lww.com/PRS/F700***.]

Postoperative safety measures included the use of drains, 10 to 12 weeks of wearing compression

Table 1. Demographic and Clinical Characteristics by Period of Time

Characteristic	Period 1 (2002–2005) (*n* = 923)	Period 2 (2006–2010) (*n* = 1272)	Period 3 (2011–2019) (*n* = 2857)	*P*
Sex, n (%)				
Female	854 (92.6)	1078 (84.8)	2368 (82.9)	0.000[a]
Male	69 (7.4)	194 (15.2)	489 (17.1)	
BMI (Kg/m^2), median (IQR)	23.5 (21.4–24.3)	22.2 (21.0–23.4)	23.9 (22.1–26.6)	0.054
Hb preprocedure (mg/dL), median (IQR)	15 (14–15)	15 (14–15)	14 (13–1.05)	0.000[a]
Hb postprocedure (mg/dL), median (IQR)	9.3 (8.9–10.1)	9.6 (9.5–10.4)	10.7 (9.9–11.6)	0.039[a]
HCT preprocedure (mg/dL), median (IQR)	43.9 (41.9–45.9)	43 (41–45.2)	43 (40.1–45.4)	0.000[a]
HCT postprocedure (mg/dL), median (IQR)	29.6 (29.2–30.7)	30.7 (27.1–30.9)	31.5 (28.9–34.2)	0.034[a]
Surgical time (min), median (IQR)	120 (105–165)	169 (122.5–206)	181 (144–230)	0.000[a]
Infiltrated volume (cc), median (IQR)	2000 (1400–2950)	3000 (1900–4000)	3900 (2600–5500)	0.000[a]
Extraction volume (cc), median (IQR)	2000 (800–2500)	4300 (3100–5600)	6400 (4600–7900)	0.000[a]
Liposculpture (alone), n (%)	344 (37.3)	283 (22.3)	286 (10)	0.000[a]
Liposculpture + other procedures, n (%)	579 (62.7)	989 (77.7)	2571 (90)	0.000[a]

BMI, body mass index; Hb, hemoglobin; HCT, hematocrit; IQR, interquartile range.
[a]Statistically significant results.

garments, postoperative massages, lymphatic drainage, and ultrasound.

VASER-Assisted HDL (2006 through 2010)

The incorporation of VASER technology to HDL resulted in reduced energy applied to tissues, and the pulse mode decreased heat generation compared with that from previous devices. Because of these features, VASER was consolidated as an efficient technology to carve the superficial fat layer while reducing the risk for skin necrosis and scarring.[1] VASER emulsified and allowed the fat to be handled like a sculptor handles clay; hence, the surgeon could sculpt the anatomy of the superficial muscles in a detailed and less traumatic manner. This technology allowed us to perform HDL in patients with overweight and secondary procedures. Because the superficial musculature affects the external appearance of the human body, a broad anatomic knowledge and an artistic perspective are both required to achieve HDL outcomes. The concept of art anatomy permitted us to handle the superficial and deep fat layers to shape the well-known three-dimensional body contour, which resulted in an increase in both surgical time (average ≈2.8 hours) and learning curve. [**See Figure, Supplemental Digital Content 2**, which shows a 42-year-old man with obesity who underwent VASER-assisted HDL. The preoperative photograph (*left*) shows abundant skin laxity and an increased abdominal perimeter; the postoperative photograph (*right*) displays not only a natural and athletic definition of both the abdominal and pectoral areas, but also improved deltoid definition, ***http://links.lww.com/PRS/F701***.]

In addition to the aforementioned perioperative measures, we started antihypothermia measures for all patients undergoing HDL with external prewarming with a thermal blanket 1 hour before and during the entire procedure. Intravenous fluids were heated to 40°C and then administered to patients. For venous thromboembolism (VTE) prophylaxis, we prescribed enoxaparin 0.5 mg/kg/day subcutaneously during the first 7 days after surgery in high-risk cases (eg, obesity, surgery time ≥3 hours, leg liposuction, lipoaspirate ≥5000 cc, family history or previous VTE). We also used multipolar radiofrequency (Venus legacy) and carboxytherapy (unusual nowadays) in selected postoperative cases.

Dynamic Definition (4D) Liposculpture (2011 through 2019)

Although the procedure itself was the same during this period, the outcomes differed. Some patients had excellent aesthetic results whereas others seemed to be lacking athletic definition; therefore, we devised a new dynamic concept, whereby each muscle group was analyzed and differentiated into either power muscles or definition muscles. For the latter, sharpness was the goal, to achieve a youthful and athletic appearance; for the former, we considered bigger as better, to give the appearance of physical strength. The technique changed by including new transition zones delimited by the contraction dynamics of two or more muscular groups.[3–5]

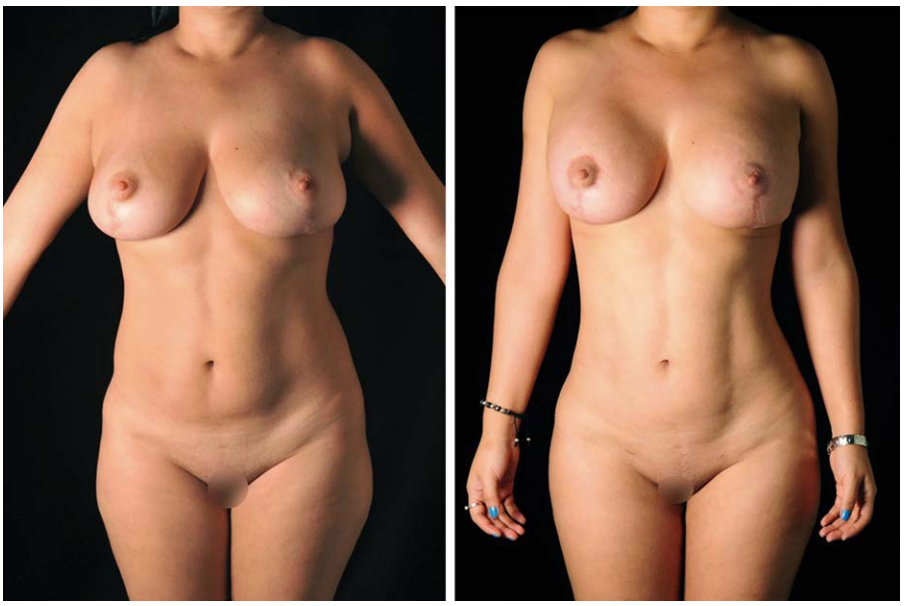

Fig. 1. A 40-year-old woman underwent 4D Lipo with basic muscular definition. The preoperative photograph (*left*) shows abundant fat deposits in the central and lateral abdominal region, compared with a slim and youthful contour observed in the postoperative photograph (*right*).

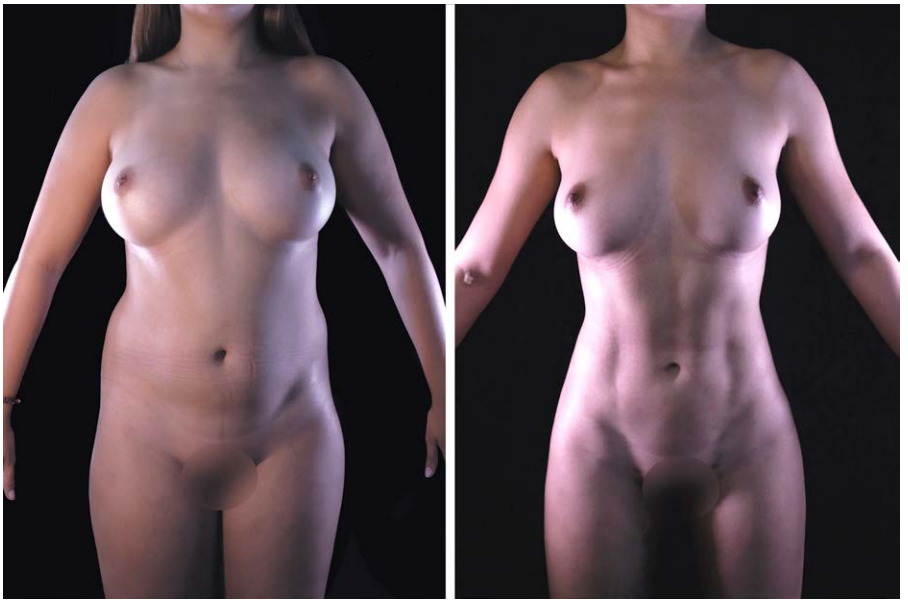

Fig. 2. A 29-year-old endomorphic woman underwent HDL with moderate muscle definition. The new abdominal athletic and slim appearance with a sharp definition of the linea alba and semilunaris line can be noted in the postoperative photograph (*right*) compared with preoperatively (*left*).

Two other concepts were introduced later in this period—the all or nothing and the 360-degree concepts—which take into consideration that performing 4D Lipo involves all body segments in order to avoid unnatural results (considering the body as a whole). Therefore, the whole surface of a body segment (eg, posterior, anterior, medial, lateral) would receive intervention to reveal its natural anatomy rather than simply defining muscles. In this manner, 4D Lipo became a true anatomic detail technique (average surgical time ≈3.1 hours) with exceptional aesthetic outcomes (Figs. 1 through 4).

Fig. 3. Preoperative (*left*) and postoperative (*right*) photographs of a 45-year-old ectomorphic man who underwent HDL with moderate muscle definition. A new athletic look can be seen, with enhanced chest projection as well as the definition of the rectus abdominis.

Fig. 4. Preoperative (*left*) and postoperative (*right*) photographs of a 47-year-old mesomorphic man who underwent HDL with extreme muscle definition. Note the fully defined rectus abdominis, oblique, serratus, and pectoral muscles as well as the new definition and projection of the deltoids.

Power-assisted liposuction plus VASER was the high-tech combination behind the methods for 4D Lipo. Both of these devices aided high precision with muscular definition; however, power-assisted liposuction was later associated with an increased risk for postoperative skin hyperlaxity and hyperchromia. Therefore, we switched to a new technology, radiofrequency, with which we used Thermi (2014), then BodyTite (2016), and later Renuvion (2018). These provided greater

skin retraction while facilitating easier performance.[9] Thereafter, we designed an algorithm (basic, moderate, and extreme) for muscular definition regarding different body biotypes, as not all patients could benefit from the same degree of definition.[10]

Protocols were optimized by using the Blanketrol system (2012) for temperature control during surgery to decrease potential complications associated with hypothermia.[11] Pneumatic compression stockings (2012) were used during surgery and replaced with high-compression stockings for postoperative recovery. In 2015, we added tranexamic acid (1 g intravenously 30 minutes before surgical incision) to the anesthesia regimen in all patients. A 24/7 nursing service was then included in our postoperative care plan, which included bathing and toilet assistance, wound care and dressings change, early ambulation encouragement, and vital signs monitoring. Hyperbaric therapy was also used to improve the recovery time of high-risk patients.

CURRENT SAFETY PROTOCOL

Preoperative

Patient Selection

The ideal patient for HDL is healthy and has good muscle tone; however, that is not always the case, so many considerations need to be evaluated in the first appointment, such as skin condition, previous surgery, underlying medical conditions, smoking habit, body mass index, and abdominal wall anatomy. Major contraindications are body mass index greater than or equal to 34 kg/m^2; severe skin redundancy or flaccidity; previous cardiovascular, respiratory, or related conditions that prohibit any major surgery (American Heart Association criteria); current heavy smoking (10 or more cigarettes per day); connective tissue diseases; and unrealistic expectations or body dysmorphic syndrome. Relative contraindications are mild smoking, moderate skin flaccidity, and body mass index 30 to 32 km/m^2, among others.

Anesthesia Consultation

Preoperative laboratory tests, imaging (when needed), and patient classification according to the American Society of Anesthesiologists physical status classification system are mandatory. Risk of VTE is assessed using the Caprini score.

Intraoperative

Hypothermia Prevention

The Blanketrol system is used for 1 hour before and during the entire procedure. Intravenous fluids are warmed (~40°C).

VTE Prevention

Intermittent pneumatic compression stockings are used.

Bleeding Control

Tumescent solution infiltration with adrenaline (1 mg/L of solution) for improved vasoconstriction is used. Tranexamic acid 1 g is administered intravenously 30 minutes before surgery.[12]

Postoperative

High-compression stockings are worn immediately after surgery. Early ambulation is strongly encouraged 12 to 24 hours after surgery. Compression garments and foam vests are mandatory for 4 weeks. Then the girdle alone must be used for 4 additional weeks. This allows adequate skin adhesion to the deep tissues, hence avoiding most contour deformities and bizarre skin folding. Enoxaparin is administered 0.5 mg/kg/day subcutaneously for 7 consecutive days after surgery according to Caprini score.

Drains are placed intraoperatively and usually removed after the first week postoperatively (upon ≤50 cc of fluid drainage in 24 hours). Hidden incisions and decline points at the inguinal region and the intergluteal crease are preferred for their location. Their permeability is crucial for lymphatic drainage, ultrasound therapy, and hyperbaric chamber sessions.

Patients with lipoaspirate volume greater than 4000 cc are hospitalized overnight for observation. Follow-up appointments are scheduled at 24 to 48 hours, 1 week, 1 month, 3 months, 6 months, 12 months, and 24 months postoperatively. Photographs are taken during each of these appointments. Patients who live in other countries must stay in the country where the procedure was performed for at least 10 days postoperatively.

RESULTS

A total of 5052 consecutive patients were found in the 18-year cohort; 4300 were women (85%) and 752 were men (15%). Homogeneity was found among groups, according to $P > 0.05$, which allows for statistical comparison of variables (Table 1).

Table 2. Most Frequent Secondary Procedures

Secondary Procedure	No.	%
Gluteal lipoinjection	3352	81
Mastopexy	1862	45.1
Lipoinjection	1531	37
Pectorals	217	14.2
Arms	159	10.4
Face	128	8.3
Another site	1027	67.1
Augmentation mammaplasty	1283	31
Mini–tummy tuck	1034	25

Table 3. Preprocedure and Postprocedure Temperatures with Implementation of Blanketrol

Time Point	Temperature (°C)
Preprocedure, mean (IQR)	35.2 (34.0–35.7)
Preprocedure, mean (IQR)	36.0 (36.0–36.0)

The most common complications related to SAL (n = 923) were seroma (18%), hematoma (5.3%), and postoperative anemia (2.7%). Two VTE events (0.2%) were described, both after mini–tummy tuck plus HDL procedures. Both patients were treated on an inpatient floor in a private clinic with intravenous anticoagulants and oxygen therapy for 7 days and discharged with oral warfarin treatment for 3 months. The mean volume of lipoaspirate was 2,000 cc.

Complications related to VASER-assisted HDL (n = 1272) were seroma (7%), hematoma (3.0%), ecchymosis, and postoperative anemia (1.6%), which substantially decreased compared with SAL; however, new complications, such as local and distal burns (0.6%), occurred. Similarly, common complications associated with 4D Lipo (n = 2857) were seroma (2.1%), hematoma (0.9%), ecchymosis, postoperative anemia (1%), and local and distal burns (0.3%). Lipoaspirate mean volume for VASER-assisted HDL and 4D Lipo were 4300 cc and 6400, cc respectively, which were significantly greater than from SAL.

HDL alone was performed in 913 patients and combined with other procedures in 4139 patients. The most frequent secondary procedures are presented in Table 2. The average postoperative temperature with the Blanketrol system was 35.2°C (Table 3), which follows the common international standards.[10] The combination of Blanketrol + tranexamic acid showed a statistically significant decrease in bleeding compared with the use of Blanketrol alone (Table 4). A complete list of complications by period is shown in Table 5 and general frequency distributions are shown in Figure 5. The 2-year follow-up

Table 4. Hematologic Measures of Blanketrol versus Blanketrol + Tranexamic Acid[a]

Characteristics	Blanketrol	Blanketrol + Tranexamic Acid	*P*
Preprocedure Hb, mg/dL	14.0(13.0–15.0)	14.0(13.0–15.0)	0.447
Postprocedure Hb, mg/dL	10.3(9.6–11.3)	10.8(9.9–11.7)	0.007[b]
Preprocedure HCT, mg/dL	43.0(40.0–46.0)	42.3 (40.1–45.0)	0.016[b]
Postprocedure HCT, mg/dL	30.0(27.6–32.9)	31.8(29.0–34.4)	0.002[b]

Hb, hemoglobin; HCT, hematocrit.
[a]Values are expressed as median (interquartile range).
[b]Significant.

meetings were completed by most patients (86%) either in person or by telemedicine. Long-term follow-up was achieved in selected cases, where pictures were taken after 10 to 12 years (Fig. 6).

A nonstandardized patient satisfaction survey was implemented in 2005. Although it was answered by patients who underwent a specific type of procedure, such as arm tuck, pectoral enhancement, or mini or full tummy tuck from 2013 to 2019, we carried out the same survey for patients undergoing 4D Lipo, all of whom reported high satisfaction (Table 6).

DISCUSSION

In 2002, patients undergoing liposuction were usually either obese or overweight, but a large population of thin or normal-weight patients were unable to benefit from the procedure. HDL emerged as a technique that could be adjusted to any type of patient with any amount of body fat.

Suction devices for SAL eased the liposuction procedure itself but did not decrease complications. Over time, we noticed that adverse events related to trauma were more frequent than we expected, so we decided to incorporate new technologies to the procedure that could make it safer and less traumatic. VASER and HDL were found to complement each other. This technology made lipoplasty of the superficial layer easier as well as more accurate and less traumatic, which substantially improved the aesthetic outcomes. Although results were already excellent, we worked to improve patient safety and reduce the rate of common complications as well as to fine-tune the technique. Then 4D Lipo emerged, with innovations in muscle dynamics, lights, and shadows, so the technique never stopped evolving. After we acknowledged that superficial muscles and deep muscles have different roles

Table 5. Major Complications Related to Each Period[a]

Complication	SAL (n = 923)	VASER-Assisted HDL (n = 1272)	Dynamic Definition Liposculpture (n = 2857)
Seroma	165 (18.0)	89 (7.0)	60 (2.1)
Hematoma	49 (5.3)	38 (3.0)	26 (0.9)
Acute anemia	25 (2.7)	21 (1.6)	29 (1.0)
Local and distal burns	Not reported	7 (0.6)	9 (0.3)
Skin necrosis	8 (0.9)	7 (0.6)	5 (0.2)
Local infections (incision)	5 (0.5)	12 (0.9)	16 (0.6)
Cellulitis (leg, thigh, pecs)	2 (0.2)	3 (0.2)	4 (0.1)
Hyperchromia	40 (4.3)	58 (4.6)	53 (1.9)
Dehiscence	8 (0.9)	23 (1.8)	14 (0.5)
Venous throm boembolism	2 (0.2)	0	0
Asymmetries	41 (4.4)	37 (2.9)	38 (1.3)
Contour irregularities	37 (4.0)	29 (2.3)	31 (1.1)
Bizarre skin adhesion	32 (3.5)	24 (1.9)	10 (0.4)
Transfusions	3 (0.3)	3 (0.2)	1 (0.03)
Other complaints (eg, headache, dizziness)	21 (2.3)	24 (1.9)	63 (2.2)

[a]Values are expressed as n (%).

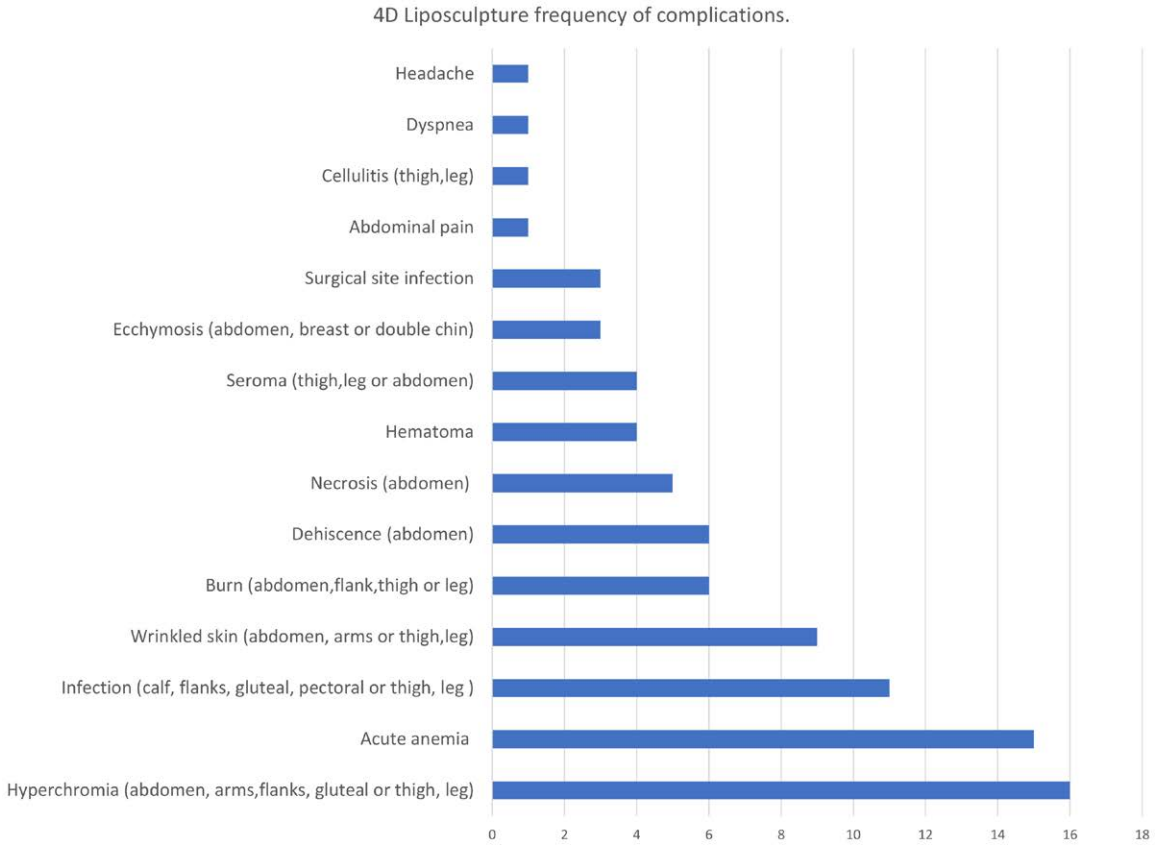

Fig. 5. Frequency distribution of complications of all HDL procedures. Leg and thigh cellulitis were classified alone because of higher incidence.

in aesthetics, we determined that power muscles should be enhanced and definition muscles should be sharply defined. This new perception allowed us to achieve more natural and muscular results while decreasing the rates of adverse events (Table 5). The notion of transition zones

Fig. 6. "Photo shoot quality" long-term follow-up of two patients who underwent 4D Lipo, with 7-year (*left*) and 10-year (*right*) postoperative photographs, respectively. Results are maintained by following a healthy diet and a workout routine 3 to 5 days per week.

and the variable degree of definition according to each body biotype[10] were also crucial topics that helped us to achieve improved outcomes in 4D Lipo, although specifics are outside the scope of this article (Fig. 7).

Bleeding and postoperative anemia are common concerns that arise because of the usual large amounts of lipoaspirate during HDL. Our data support a statistically significant decrease in these events (Table 1) when comparing the third period with periods 1 and 2, regardless of the lipoaspirate volume (higher for period 3), which supports the technique's evolution to a safer procedure. Independent analysis showed that the combination of tranexamic acid + Blanketrol decreases bleeding during surgery compared with Blanketrol alone, with statistically significant values. Five out of seven cases that required transfusion were mini tummy tuck procedures, which could be explained by the increased trauma after excisional body contour procedures. Nonetheless, the absolute risk of requiring a transfusion after 4D Lipo is almost zero (0.03%).

Drains helped reduce seroma incidence and allowed us to increase the volumes of infiltration and fat extraction. The first period showed a higher incidence of hematoma and seroma compared with that from average standards, which could be caused by SAL; however, we later found that early postoperative edema was being labeled as seroma and the data were not modifiable. Dehiscence and local infections were higher in period 2 compared with periods 1 and 3, which might imply that VASER itself could somehow

Table 6. Satisfaction Index among Patients Undergoing HDL or 4D Lipo Procedures[a]

Procedure	Above Expectations	Good Results	Average Results	Below Expectations	Poor Results
Pectoral 4D Lipo[4] ($n = 136$)	115 (84.6)	13 (9.6)	7 (5.1)	0	1 (0.7)
Arm 4D Lipo[3] ($n = 427$)	378 (88.5)	42 (9.8)	5 (1.2)	2 (0.5)	0
4D mini tummy tuck[5] ($n = 141$)	103 (78)	26 (18.4)	8 (5.7)	3 (2.1)	1 (0.7)
4D full tummy tuck[b] ($n = 663$)	548 (81.8)	67 (10)	34 (5.1)	14 (2.1)	0
Variable degree 4D Lipo[10] ($n = 1489$)	1132 (76)	238 (16)	91 (6)	28 (2)	0

[a]Values are expressed as *n* (%).
[b]Hoyos A, Perez ME, Guarin DE, Montenegro A. A report of 736 high-definition lipoabdominoplasties performed in conjunction with circumferential liposuction. *Plast Reconstr Surg.* 2018;142:662–675.

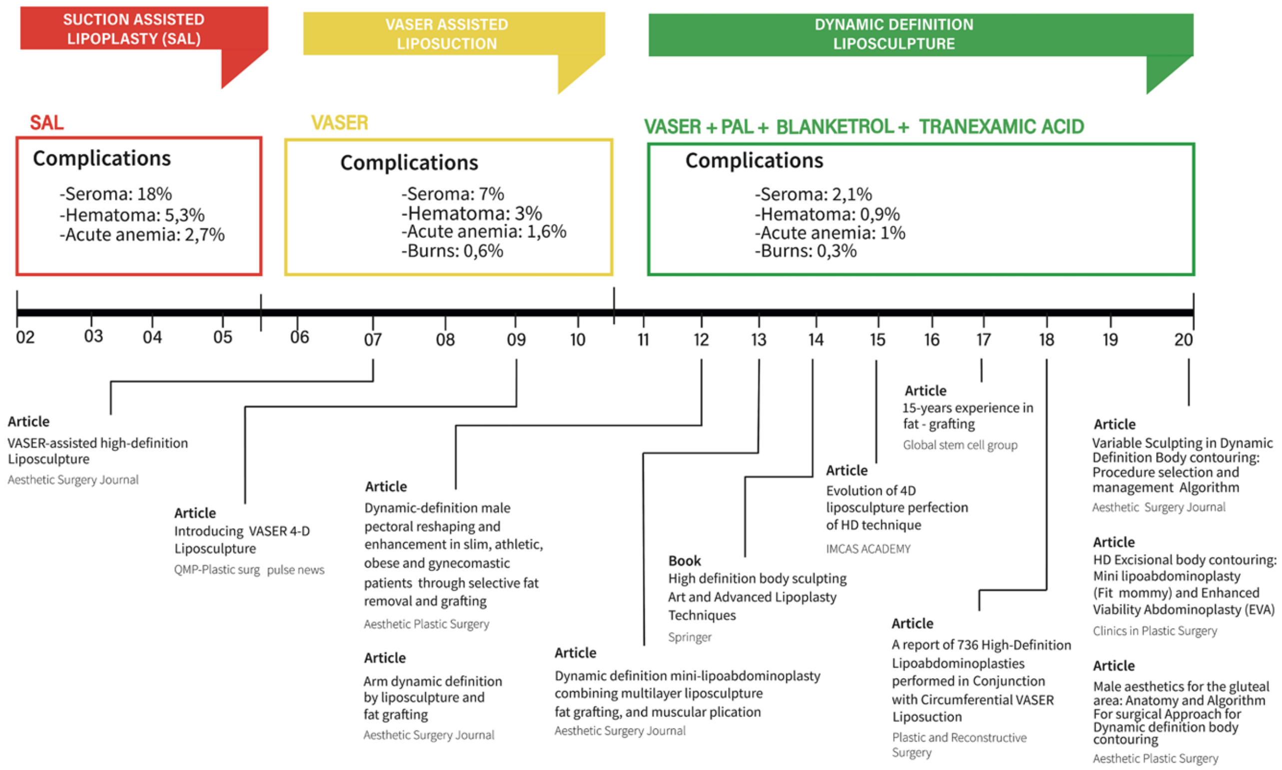

Fig. 7. HDL evolution timeline and the most relevant publications related to the technique.

cause heat trauma over the ports, altering the early phase of tissue healing. Moreover, legs and thighs were more prone to cellulitis, hematoma, and seroma (Fig. 5), which could be secondary to gravity and the decreased perfusion following postoperative edema. Although no compartmental syndromes were reported, further studies need to be conducted to support our findings. Skin necrosis incidence was very low among the three periods (~0.6%); furthermore, the tendency has been toward decline as the procedure has evolved. Most patients with postoperative contour irregularities or asymmetries had to undergo a revision procedure, but the incidence decreased as the techniques improved (Table 5). It should also be noted that a simple rule of three showed that the amount of lipoaspirate could have been increased by 42% in the third period to reach the same hemoglobin average level from the first period. Likewise, it could have been increased by 38.5% during the third period to reach the average hemoglobin level from the second period. When considering the hematocrit (a direct measure of red blood cell population), results were 20% and 6.5% increase in the lipoaspirate volume in the third period to reach the same hematocrit level from the first and the second periods, respectively.

Further studies should be carried out to analyze the differences among radiofrequency devices for 4D Lipo, although in our experience, they all provide a greater retraction of the skin, which improves the aesthetic results.[9] Moreover, although not mentioned in our data, these new devices are effective for patients who require any revision procedure, because radiofrequency helps to soften the fibrous tissue while keeping the skin safe.

CONCLUSIONS

The HDL technique has evolved through extensive medical, anatomic, artistic, and technological knowledge to provide patients improved higher aesthetic results framed in surgical safety. The technique needs future developments to improve the surgeon's performance and hopefully reach the "zero rate" of complications. This long-term HDL experience has taught us that no matter how good we are, we still have a lot to learn and a lot to improve. Further data and studies, as well as multicenter studies with various

HDL-trained surgeons, are needed to support our findings.

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