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Liposuction Followed by Helium Plasma Radiofrequency Versus Liposuction Control: A Retrospective Study Evaluating Patient Satisfaction

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Background: Liposuction is widely performed for body contouring, but concerns regarding residual sagging and contour irregularities remain as limitations of this technique. Heat-emitting technologies aim to stimulate skin contraction, and radiofrequency (RF) energy is considered effective. However, patient satisfaction is essential to confirm its clinical benefit.

Methods: This retrospective observational study analyzed the outcomes of 113 patients who underwent either conventional liposuction (n = 73) or liposuction followed by helium plasma RF (n = 40) performed by a single surgeon. Objective outcomes, complications, and the BODY-Q questionnaire were used to assess the procedural data and patient satisfaction.

Results: In the long-term subgroup, patients treated with helium plasma RF reported significantly higher BODY-Q scores for appraisal of excess skin across all comparisons: full long-term cohort (87.8 versus 73.8), subgroup without abdominoplasty (92.8 versus 64), and subgroup excluding lipoabdominoplasty-only cases (87.8 versus 73.4). Among patients who did not undergo abdominoplasty, satisfaction with the abdominal appearance was also significantly higher (68.8 versus 45). Although satisfaction scores for other regions favored the helium plasma RF group, these differences were not statistically significant. The helium plasma RF group had a lower abdominoplasty rate (30% versus 67.1%), higher aspirated volumes (3357.1 versus 2637.2 mL), and a significantly lower revision rate (12% versus 37.5%). The complication rates were similar between the groups (2.5% versus 2.7%).

Conclusions: Liposuction followed by helium plasma RF was associated with favorable patient-reported satisfaction regarding abdominal contour and excess skin, lower revision and abdominoplasty rates, and higher aspirated volumes, with a safety profile comparable to that of conventional liposuction. *(Plast Reconstr Surg Glob Open 2026;14:e7527; doi: 10.1097/GOX.0000000000007527; Published online 13 March 2026.)*

INTRODUCTION

Liposuction is among the most commonly performed procedures for body contouring.[1–3] Although it is effective in reducing localized fat deposits, concerns remain regarding residual sagging and contour irregularities, particularly in patients with moderate to severe sagging, poor skin quality and elasticity, or large volumes aspirated.[3–5] These factors may lead surgeons to under-aspirate certain areas to avoid worsening contour deformities.

Superficial or subdermal liposuction has been explored to increase skin retraction[6–9]; however, they present a higher risk of complications such as seroma, pigmentation changes, contour irregularities, and even skin necrosis.[10] Therefore, there has been growing interest in the use of adjuvant heat-emitting energy-based technologies to increase subcutaneous tone and promote skin contraction.

Among these technologies, radiofrequency (RF) energy can generate heat within subdermal tissues,

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resulting in collagen denaturation, contraction, and subsequent neocollagenesis.[3,11] Helium plasma RF (Renuvion, Apyx Medical, Clearwater, FL) allows precise delivery of thermal energy with minimal injury to adjacent tissues. It has been proposed as an effective adjunct to liposuction for enhancing skin contraction and, in April 2023, received US Food and Drug Administration clearance for aesthetic body contouring following liposuction.[3,12,13]

Many prior studies evaluating sagging skin have used methods such as photographic analysis or skin surface area measurements.[4,10,14–16] Although these approaches can quantify physical changes, they do not capture the patient's subjective perception of results. The BODY-Q questionnaire is a validated tool that provides insight into patient-reported satisfaction, an important subjective metric for evaluating aesthetic outcomes.[17–19]

Despite the increasing use of helium plasma RF technology, there is a shortage of clinical studies incorporating patient-reported outcomes to compare liposuction followed by treatment with helium plasma RF with conventional liposuction techniques. In this study, we presented our clinical experience with liposuction followed by treatment with helium plasma RF and compared the outcomes with those of conventional liposuction, integrating both objective assessments and patient-reported measures.

Takeaways

Question: Can the addition of helium plasma radiofrequency (RF) to liposuction improve skin contraction, reduce the need for abdominoplasty, and increase patient satisfaction compared with conventional liposuction?

Findings: In this retrospective study of 113 patients, those treated with liposuction followed by helium plasma RF had higher patient-reported satisfaction with abdominal appearance and excess skin, a lower abdominoplasty rate (30% versus 67.1%), a lower revision rate (12% versus 37.5%), and higher aspirated volumes, with complication rates comparable to those of conventional liposuction.

Meaning: Helium plasma RF may enhance aesthetic outcomes following liposuction while maintaining a similar safety profile.

METHODS

We retrospectively reviewed the medical records of 113 patients who underwent either conventional liposuction (n = 73) or liposuction followed by treatment with helium plasma RF (n = 40), all performed by the lead author (P.H.) between October 2021 and October 2023. Demographic data collected included age, body mass index (BMI), BMI variation, postoperative follow-up duration, and whether patients were included in the long-term (>12-mo follow-up) subgroup analysis. Only patients with at least 30 days of follow-up were included in the total cohort, which was analyzed for procedural characteristics and safety outcomes. For long-term data analysis, only patients with a follow-up period greater than 1 year were included (Table 1), resulting in comparable group sizes of 25 and 24 in the helium plasma RF and conventional liposuction groups, respectively. The long-term subgroup outcomes included changes in body measurements and patient-reported scores from the BODY-Q questionnaire.

Patient-reported outcomes were evaluated using 2 domains of the BODY-Q questionnaire: satisfaction with appearance and quality of life (QoL). The satisfaction with appearance domain included subscales assessing the abdomen, back, body, buttocks, upper arms, inner thighs, hips/outer thighs, and appraisal of excess skin. The QoL domain includes subscales for body image, psychological function, social function, sexual well-being, and appearance-related psychosocial distress. Responses were converted to Rasch-transformed scores ranging from 0 to 100 using established conversion tables, with higher scores indicating greater satisfaction or QoL.[17–19]

This was an investigator-initiated retrospective chart review based on procedures performed in the lead author's private surgical practice. Funding support was provided by Apyx Medical through an independent research grant. Apyx Medical had no role in the study design, patient selection, data collection, statistical analysis, or interpretation of the results.

Operative data collected for the total cohort (n = 113) included the areas aspirated, whether abdominoplasty and/or gluteal fat grafting was performed (Table 2), and the volumes of fat aspirated and/or grafted (Table 3). Long-term subgroup data included changes in body measurements (Table 4), patient-reported outcomes (Table 5), postoperative complications, and the need for revision procedures (Table 6). Preoperative and postoperative body measurements for the long-term subgroup were recorded at multiple anatomical landmarks, including the circumferences at the biacromial, axillary, xiphoid process, waist, umbilical, anterior superior iliac spines, proximal thighs, and the proximal, mid, and distal arms.

Complications were categorized as hematoma, seroma, skin necrosis, infection, severe anemia requiring

Table 1. Demographic Data of the Total Sample and the Long-term Follow-up Subgroup

Variable	Total Cohort: Helium Plasma RF	Total Cohort: Liposuction	*P* (Total)	Long Term: Helium Plasma RF	Long Term: Liposuction	*P* (Long Term)
No. patients	40	73		25 (62.5%)	24 (32.9%)	0.002
Mean age ± SD, y	42.3 ± 8.5	41.4 ± 10.2	0.597	43.6 ± 8.1	45.0 ± 11.1	0.615
Mean follow-up ± SD, mo	18.1 ± 10.2	21.6 ± 17.1	0.170	23.3 ± 8.0	30.6 ± 12.2	0.019
Mean BMI ± SD, kg/m^2	26.6 ± 2.9	26.5 ± 4.2	0.979	26.1 ± 3.0	25.8 ± 4.4	0.823
Mean BMI variation ± SD, %	-0.4 ± 4.3	-0.3 ± 4.9	0.934			

Table 2. Distribution of Treated Areas and Concomitant Procedures by Group (Total Cohort and Long-term Subgroup)

Variable	Total Cohort: Helium Plasma RF, n (%) (n = 40)	Total Cohort: Liposuction, n (%) (n = 73)	*P* (Total)	Long Term: Helium Plasma RF, n (%) (n = 25)	Long Term: Liposuction, n (%) (n = 24)	*P* (Long Term)
Aspirated areas						
Abdomen	38 (95.0)	70 (95.9)	0.826	25 (100.0)	24 (100.0)	1.000
Back	37 (92.5)	44 (60.3)	<0.001	25 (100.0)	18 (75.0)	0.008
Inner thighs*	19 (47.5)	14 (19.2)	0.002	14 (56.0)	4 (16.7)	0.004
Outer thighs/hips*	14 (35.0)	17 (23.3)	0.007	8 (32.0)	5 (20.8)	0.376
Arms*	24 (60.0)	9 (12.3)	<0.001	17 (68.0)	2 (8.3)	<0.001
Other aspirated areas†	27 (67.5)	39 (53.4)	0.147	18 (72.0)	6 (25.0)	0.001
Abdominoplasty	12 (30.0)	49 (67.1)	0.0002	11 (44.0)	18 (75.0)	0.027
Gluteal fat grafting‡	24 (60.0)	28 (38.4)	0.0005	15 (60.0)	11 (45.8)	0.252

*Subject numbers are reported; however, given these body areas (inner thighs, outer thighs/hips, and arms), 2 procedures were performed, 1 on each side of the body.
†Anterior axillary, neck, lateral chest, or mammary regions.
‡Helium plasma RF was used in the gluteal region of 7 patients before fat grafting. Of these, 4 were part of the long-term subject subgroup.

Table 3. Aspirated/Grafted Volumes by Region (mL ± SD) in the Total Cohort and Long-term Subgroup

Region	Total Cohort Helium Plasma RF (n = 40), mL ± SD	Total Cohort Liposuction (n = 73), mL ± SD	*P* (Total)	Long-term Helium Plasma RF (n = 25), mL ± SD	Long-term Liposuction (n = 24), mL ± SD	*P* (Long Term)
Abdomen	(n = 38), 1256.8 ± 471.3	(n = 70), 1345.5 ± 569.2	0.389	(n = 25), 1247.4 ± 461.6	(n = 24), 1215.8 ± 441.2	0.808
Back	(n = 37), 1337.7 ± 691.9	(n = 44), 1517.3 ± 613.3	0.225	(n = 25), 1212.8 ± 547.5	(n = 18), 1268.9 ± 576.6	0.750
Inner thighs*	(n = 19), 382.9 ± 127.4	(n = 14), 356.1 ± 153.0	0.454	(n = 14), 384.3 ± 98.2	(n = 4), 238.8 ± 143.8	0.025
Outer thighs/hips*	(n = 14), 231.8 ± 96.7	(n = 17), 267.1 ± 174.6	0.320	(n = 8), 228.1 ± 75.4	(n = 5), 216.0 ± 122.4	0.783
Arms*	(n = 24), 214.0 ± 54.3	(n = 9), 173.3 ± 59.0	0.017	(n = 17), 210.9 ± 58.7	(n = 2), 225.0 ± 28.9	0.451
Other areas† (n = 27)	(n = 27), 184.4 ± 201.1	(n = 39), 255.1 ± 241.7	0.201	(n = 18), 145.0 ± 104.2	(n = 6), 270.0 ± 222.3	0.234
Total aspirated	3357.1 ± 1426.6	2637.2 ± 1496.9	0.014	3449.4 ± 1065.4	2446.3 ± 1022.4	0.002
Gluteal regions (fat graft)‡	(n = 24), 360.0 ± 190.2	(n = 28), 302.0 ± 112.7	0.284	(n = 15), 330.0 ± 130.2	(n = 11), 308.0 ± 92.2	0.659

Sample sizes for some subgroup comparisons are small, and results should be interpreted with caution.
*Subject numbers are reported; however, given these body areas (inner thighs, outer thighs/hips, and arms), 2 procedures were performed, 1 on each side of the body.
†Anterior axillary, neck, lateral chest, or mammary regions.
‡Patients who underwent fat grafting and helium plasma RF on the buttocks (n = 4) versus the remaining patients who underwent fat grafting without helium plasma RF on the buttocks, regardless of whether they underwent helium plasma RF on other liposuctioned areas (n = 22).

transfusion, or deep vein thrombosis/thromboembolism. Surgical revisions were categorized as additional aspiration for residual lipodystrophy, correction of contour irregularities, and correction of residual sagging with skin excision.

The conventional technique uses power-assisted liposuction (PAL) and a standard tumescent solution. In the helium plasma RF group, after PAL was completed, helium plasma RF was applied at 60%–80% power with 2.5–3.0 liters per minute of helium flow to the liposuctioned areas, with 6 passes at varying depths. Postoperative care was standardized across both groups, including continuous compression garment use for 2 months, lymphatic taping for the first 2 weeks (with weekly replacement), and no recommendation for manual lymphatic drainage massage.

As part of standard surgical planning, the investigator assessed the skin quality and categorized it as good, moderate, or poor. The degree of sagging was classified subjectively as none, minimal, moderate, or severe. These assessments were based on validated or standardized scales and should be interpreted as clinical impressions. In patients with poor skin quality, reduced elasticity, and severe sagging, skin resection is indicated as a standard practice.

Institutional review board ethics approval for this retrospective study was obtained under the reference number CAAE: 79956624.0.0000.8040 from the Ministry of Health National Ethics Board of Brazil. The ethics committee did not mandate that the informed consent form be applied to all participants but requested that a template be created and used when possible for those completing the patient satisfaction questionnaire. All participants signed a consent form before surgery as part of routine clinical care. In addition, patients whose images were included in this publication provided written consent for the use of their photographs.

Statistical Analysis

Data were collected and stored in a Microsoft Excel spreadsheet, and descriptive statistics were computed to compare the total sample and subgroups. Continuous variables are expressed as mean ± SD, and categorical variables as frequencies and percentages. To identify

Table 4. Long-term Subgroup Body Measurements Variations (Circumference) ± SD, %

	Helium Plasma RF (n = 25)	Liposuction (n = 24)	*P*
Biacromial	(n = 25), 0.7 ± 4.6	(n = 24), 0.6 ± 2.4	0.9
Axillary	(n = 25), −0.4 ± 2.6	(n = 24), 0.3 ± 2.7	0.372
Abdomen (overall)	(n = 25)	(n = 24)	
Xiphoid process	−1.1 ± 5.1	0.5 ± 4.9	0.191
Waist	−1.9 ± 4.9	−0.2 ± 4.6	0.244
Umbilical	−4.3 ± 4.8	−6.5 ± 5.4	0.148
Iliac spines	−1.7 ± 4.3	−3.1 ± 4.5	0.27
All together	−2.2 ± 4.9	−2.3 ± 5.2	0.884
Abdomen (only liposuction)*	(n = 14)	(n = 6)	
Xiphoid process	−0.9 ± 5.5	2.5 ± 1.5	0.049
Waist	−2.4 ± 5.7	3.7 ± 6.2	0.071
Umbilical	−4.5 ± 4.5	−6.7 ± 5.5	0.411
Iliac spines	−2 ± 4.6	−2 ± 4	0.974
All together	−2.4 ± 5.2	−0.6 ± 6	0.202
Hips/maximal gluteal projection†	(n = 4), 1.6 ± 3.1	(n = 22), 0.8 ± 2.5	0.637
Proximal thigh‡	(n = 15), −2 ± 2.7	(n = 7), −0.5 ± 5.3	0.332
Arm‡	(n = 16)	(n = 2)	
Proximal	−3.4 ± 4.3	−5.5 ± 4.9	0.464
Middle	−2.8 ± 4.4	−6.5 ± 8.6	0.458
Distal	−0.8 ± 4.5	0.6 ± 8.2	0.75
All together	−2.3 ± 4.5	−3.8 ± 7.5	0.524

Sample sizes for some subgroup comparisons are small, and results should be interpreted with caution.
*Patients who underwent associated abdominoplasty were excluded.
†Patients who underwent fat grafting and helium plasma RF on the buttocks (n = 4) versus the remaining patients who underwent fat grafting without helium plasma RF on the buttocks, regardless of whether they underwent helium plasma RF on other liposuctioned areas (n = 22).
‡Subject numbers are reported; however, given these body areas (inner thighs, outer thighs/hips, and arms), 2 procedures were done, 1 on each side of the body.

Table 5. Long-term Subgroup BODY-Q Results

	Helium Plasma RF (n = 25)	Liposuction (n = 24)	*P*
QoL, mean ± SD			
Appearance-related psychosocial distress	24.1 ± 15.8	20.8 ± 15.9	0.477
Body image	66.2 ± 13.4	66.2 ± 17.1	0.994
Social function	74.8 ± 15.7	76.9 ± 15.9	0.641
Psychological function	75.6 ± 15.9	82 ± 18.9	0.207
Sexual function	70.5 ± 17.7	76.5 ± 23.9	0.896
Appearance, mean ± SD			
Satisfaction with abdomen			
Overall	69.2 ± 21.7	68.3 ± 26.4	0.896
Only liposuction*	68.8 ± 20.8(n = 14)	45 ± 24.6 (n = 6)	0.039
Lipoabdominoplasty†	78.5 ± 14.5 (n = 11)	72.9 ± 24.1 (n = 18)	0.541
Satisfaction with back	67 ± 23.1 (n = 25)	66.2 ± 29.6 (n = 24)	0.927
Satisfaction with body	67.6 ± 15.4 (n = 25)	66.7 ± 20.7 (n = 24)	0.871
Satisfaction with buttocks‡	79.8 ± 9.4 (n = 4)	69.5 ± 22.3 (n = 22)	0.157
Satisfaction with upper arms	61.9 ± 19.2 (n = 17)	59 ± 7.1 (n = 2)	0.699
Satisfaction with inner thighs	55.8 ± 25.1 (n = 14)	43.8 ± 25.9 (n = 4)	0.449
Satisfaction with hips/outer thighs	80.6 ± 16.6 (n = 8)	73.8 ± 24.6 (n = 5)	0.603
Appraisal of excess skin			
Overall	87.8 ± 17.6	73.8 ± 25	0.03
Only liposuction*	92.8 ± 12 (n = 14)	64 ± 30.4 (n = 6)	0.006
Excluded lipoabdominoplasty only§	87.8 ± 17.6 (n = 25)	73.4 ± 26.2 (n = 18)	0.037

*Patients who underwent abdominoplasty were excluded.
†Patients who underwent abdominoplasty and helium plasma RF on the abdomen (n = 4) versus the remaining patients who underwent abdominoplasty without helium plasma RF on other liposuctioned areas (n = 18).
‡Patients who underwent fat grafting and helium plasma RF on the buttocks (n = 4) versus the remaining patients who underwent fat grafting without helium plasma RF on the buttocks, regardless of whether they underwent helium plasma RF on other liposuctioned areas (n = 22).
§Patients who underwent lipoabdominoplasty only, without liposuction in another area (6 patients of the liposuction group), were excluded.

significant differences between subgroups, the Student *t* test was used for continuous variables, and the χ^2 test was used for categorical variables. The minimum level of significance was set at 95% ($P < 0.05$).

Evaluation of Outcome Reported by the Patient

A questionnaire was administered based on the 2 domains of the BODY-Q. Thirteen subthemes were distributed across the domains: appearance-related psychosocial

Table 6. Complications and Revisions

	Total Cohort, n (%) (n = 113)	Helium Plasma RF, n (%) (n = 40)	Liposuction Only, n (%) (n = 73)	*P*
Complications				
Hematoma	0	0	0	N/A
Seroma	2 (1.8)	1 (2.5)	1 (1.4)	0.663
Skin necrosis	0	0	0	N/A
Infection	0	0	0	N/A
Severe anemia/transfusion	1 (0.9)	0	1 (1.4)	0.453
Fat embolism	0	0	0	N/A
DVT/tromboembolism	0	0	0	N/A
Total	3 (2.7)	1 (2.5)	2 (2.7)	0.94
Revisions (n = 49)				
Residual lipodystrophy	9 (18.4)	2 (8)	7 (29.2)	0.056
Contour irregularities	1 (2)	1 (4)	0	0.322
Residual sagging/skin excision	2 (4.1)	0	2 (8.3)	0.141
Total revisions*	12 (24.5)	3 (12)	9 (37.5)	0.038
Total patients with complications	11 (22.5)	3 (12)	8 (33.3)	0.074

*More than 1 type of revision surgery was performed on a single patient in the liposuction group.
DVT, deep vein thrombosis; N/A, not available.

distress, body image, social function, psychological function, and sexual function in the QoL domain; and satisfaction with the abdomen, back, body, buttocks, upper arms, inner thighs, and hips/outer thighs, and appraisal of excess skin in the appearance domain. The sum of each subtheme was converted into a score from 0 to 100 using the Rasch measurement method with conversion tables, where higher scores indicate better outcomes or QoL.

RESULTS

Between October 2021 and October 2023, 73 patients underwent conventional liposuction, and 40 underwent liposuction followed by treatment with helium plasma RF (Figs. 1–4). There were no statistically significant differences between groups in terms of age, BMI, or BMI variation. BMI and BMI variation were comparable between groups, with mean BMI values of 26.6 ± 2.9 and 26.5 ± 4.2 kg/m^2, and BMI variation of −0.4% ± 4.3 and −0.3% ± 4.9 in the helium plasma RF and conventional liposuction groups, respectively. In the long-term subgroup, a higher proportion of patients were from the helium plasma RF group (62.5% versus 32.9%), and the mean postoperative follow-up duration was significantly longer in the helium plasma RF group (30.6 versus 23.3 mo) (Table 1).

The average aspirated fat volume was higher in the helium plasma RF group than that in the conventional liposuction group (3357.1 versus 2637.2 mL). The abdominoplasty rate was significantly lower in the helium plasma RF group (30% versus 67.1%). Additionally, patients in the helium plasma RF group more frequently underwent treatment in a wider range of areas, such as the back, inner thighs, arms, and other regions (Tables 2, 3).

Among patients who did not undergo abdominoplasty, a statistically significant reduction in xiphoid process circumference was observed in the helium plasma RF group (−0.9% versus +2.5%; P = 0.049). However, this subanalysis included only 14 and 6 patients, respectively, and was not sufficiently powered to detect small differences, thus limiting meaningful conclusions. No significant differences were observed in other measurements (Table 4).

In the BODY-Q questionnaire responses for the long-term subgroup (Table 5), no statistically significant differences were observed between the groups across the 5 health-related QoL subscales. Although these results do not demonstrate equivalence, they reflect a lack of detected differences that may be attributable to small sample sizes or variability. In the appearance-related satisfaction module, patients in the helium plasma RF group (n = 25) reported higher satisfaction scores across nearly all body regions than those in the liposuction group (n = 24); however, these differences were not statistically significant.

However, a consistent and statistically significant advantage was observed for the helium plasma RF group in the appraisal of excess skin, which had significantly higher scores across all analytical scenarios, including the overall long-term cohort (87.8 versus 73.8; P = 0.03), among patients who underwent liposuction alone without abdominoplasty (92.8 versus 64; P = 0.006), and excluding lipoabdominoplasty-only cases (87.8 versus 73.4; P = 0.037). Additionally, among patients who did not undergo abdominoplasty, satisfaction with the abdominal appearance was significantly higher in the helium plasma RF group (68.8 versus 45; P = 0.039). These findings suggest a meaningful patient-perceived benefit of helium plasma RF in specific treatment settings, particularly in terms of improvements in skin quality and abdominal contour; however, the subjective nature of these metrics and cohort imbalances outside of the full dataset warrant cautious interpretation (Table 5).

The incidence of complications was low and similar between the groups (2.5% for helium plasma RF versus 2.7% for liposuction), with only isolated cases of seroma and anemia observed. Notably, the helium plasma RF group had a significantly lower total surgical revision rate (12% versus 37.5%, P = 0.038). The difference in the rates of residual lipodystrophy (8% versus 29.2%, P = 0.056)

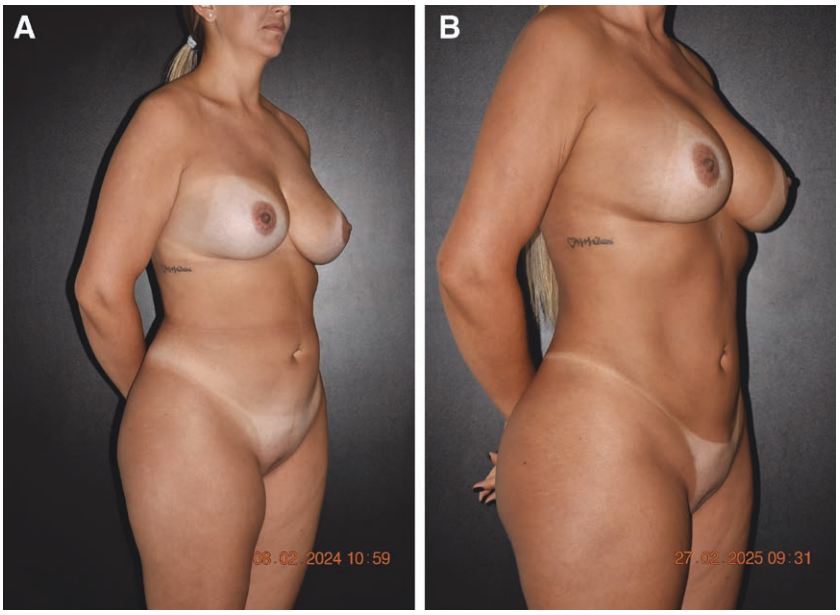

Fig. 1. Thirty-nine-year-old mother of 2. A total of 1300 mL of fat was removed from the abdomen, followed by helium plasma RF subdermal and fibroseptal coagulation (80% power, 2.5 LPM, 6 passes). A, Preoperative. B, One year postoperatively.

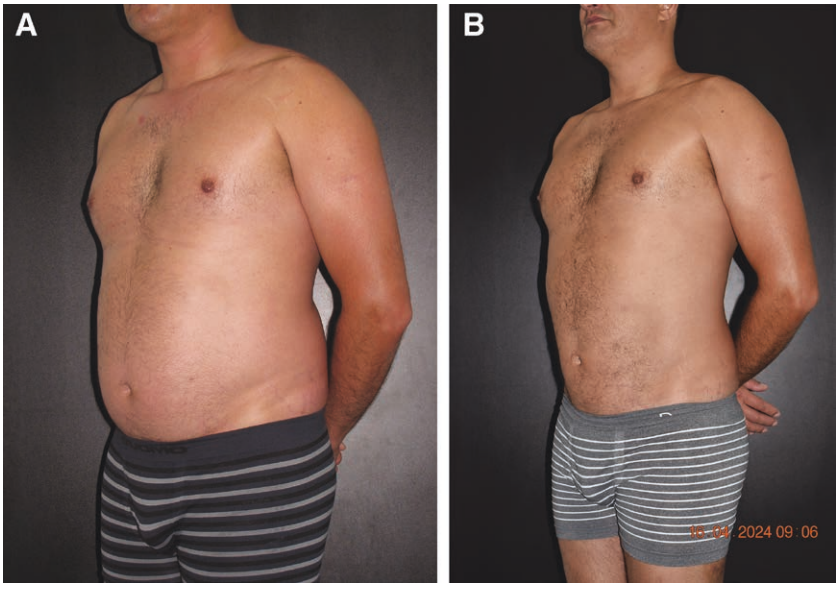

Fig. 2. Forty-five-year-old patient. A total of 2090 mL of fat was removed from the abdomen, followed by helium plasma RF subdermal and fibroseptal coagulation (80% power, 2.5 LPM, 6 passes). A, Preoperative. B, One year postoperatively.

approached statistical significance but did not meet the conventional threshold (Table 6).

Representative clinical photographs of the helium plasma RF group are shown in Figures 1–4. These images illustrate the outcomes in patients who underwent liposuction with helium plasma RF, including abdominal and dorsal contouring, with or without fat grafting. Examples of clinical photographs from the PAL only group are shown in Figure 5. All images were presented with appropriate patient consent and were intended to demonstrate typical outcomes.

DISCUSSION

Multiple technologies have been used to achieve skin contraction after liposuction, as conventional aspiration promotes a maximum retraction of approximately 10% due to nonthermal inflammation of the fibrocollagen

Fig. 3. Thirty-seven-year-old patient. A total of 3200 mL of fat was removed from the abdomen, followed by helium plasma RF subdermal and fibroseptal coagulation (80% power, 2.5 LPM, 6 passes). A and B, Preoperative. C and D, Five months postoperatively.

matrix, with the formation of new blood vessels, collagen, and scar tissue.[3,11] Several articles in the plastic surgery literature have demonstrated clinical improvement with apparent skin retraction using heat-emitting energy-based technologies; however, most studies measured the reduction in the skin surface area rather than the sagging itself.[1,4,10,16,20,21] Sagging is defined as the amount of acute elastic deformation that occurs under a given tension, with the degree of sagging characterizing tissue laxity or looseness.[22] Therefore, the degree of improvement in sagging cannot be assessed solely by measuring the reduction in the skin surface area, without considering the subcutaneous tone and the degree of adhesion to the deep fascia.

In this context, patient-reported outcomes offer valuable insights into perceived effectiveness and complement clinical and photographic evaluations. Although not objective measures, they reflect satisfaction and QoL, which are critical for evaluating the success of aesthetic procedures. Instruments such as the BODY-Q are validated tools developed specifically to quantify patient-centered outcomes in aesthetic surgery, enabling reproducibility and meaningful interpretation across studies. Although patient-reported outcomes are inherently subjective, they

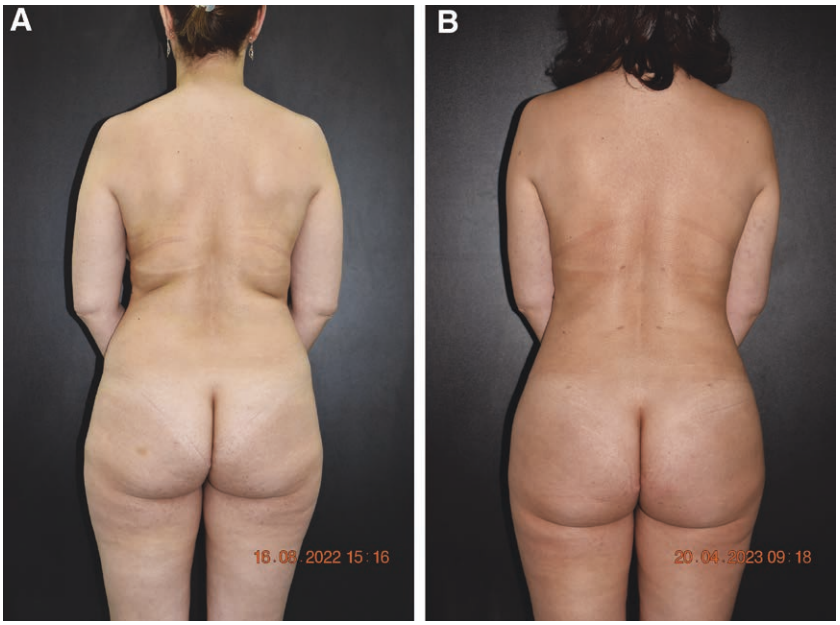

Fig. 4. Forty-four-year-old patient. A total of 980 mL of fat was removed from the dorsum, followed by helium plasma RF subdermal and fibroseptal coagulation (80% power, 2.5 LPM, 6 passes), and an additional 780 mL was grafted in the buttocks, following helium plasma RF subdermal and fibroseptal coagulation (60% power, 2.5 LPM, 6 passes). A, Preoperative. B, Eight months postoperatively.

are increasingly recognized as essential metrics in aesthetic surgery, capturing aspects such as patient satisfaction, self-image, and psychosocial benefit, dimensions not addressed by purely objective measures.

In our study, patients in the helium plasma RF group reported higher satisfaction scores across most BODY-Q modules; however, these differences were not statistically significant in most categories. Importantly, statistical nonsignificance does not imply equivalence between groups but may reflect limited sample size or variability within the data. Notably, the appraisal of excess skin demonstrated statistically significant improvements in the helium plasma RF group across all comparisons within the long-term patient subset, including the full long-term cohort, the subgroup that underwent liposuction only, and the subgroup excluding patients who received lipoabdominoplasty alone. Satisfaction with abdominal appearance was also significantly higher in the helium plasma RF group among patients who did not undergo abdominoplasty. These findings suggest a consistent patient-perceived benefit of helium plasma RF with respect to excess skin and abdominal contours. Nonetheless, the interpretation should remain cautious, given the retrospective design and small subgroup sizes. Further prospective, adequately powered studies are warranted to confirm these observations.

These results suggest that the use of helium plasma RF was associated with favorable outcomes, and the helium plasma RF group demonstrated superior results in multiple analyses, including a lower rate of abdominoplasties, a lower rate of surgical revisions, and larger areas and volumes aspirated. Although these findings may suggest potential advantages of the technology, such as enabling the treatment of more areas or higher aspirate volumes with satisfactory outcomes, they may also reflect differences in patient selection or surgical planning. Given the retrospective design and lack of randomization, no causal conclusions can be drawn.

The greater aspirated fat volume observed in the helium plasma RF group likely reflects a procedural advantage conferred by the device's enhanced skin contraction capabilities. Conventional liposuction typically results in modest skin contraction (~8%–10%[3]), which may limit the extent of aspirate due to concerns about iatrogenic sagging, especially in patients with baseline laxity. In contrast, helium plasma RF-assisted liposuction has been associated with significantly greater contraction (up to 36%[3]), allowing the surgeon to treat more areas and aspirate larger volumes with confidence in postoperative skin retraction. As such, the higher aspirate volume in the RF group may have contributed to the improved satisfaction scores observed, representing an indirect benefit of the technology.

The potential for increased complications is a controversial topic regarding the use of adjunctive liposuction technologies. However, our study, corroborating previously published data,[11–13] demonstrated a complication rate equivalent to that of conventional liposuction, with no complications attributable specifically to the helium plasma RF device. Owing to its unique method of action, delivering rapid bursts of heat with minimal propagation to surrounding tissues owing to almost instantaneous heating and cooling, helium plasma RF enables the application of higher temperatures with greater collagen coagulation

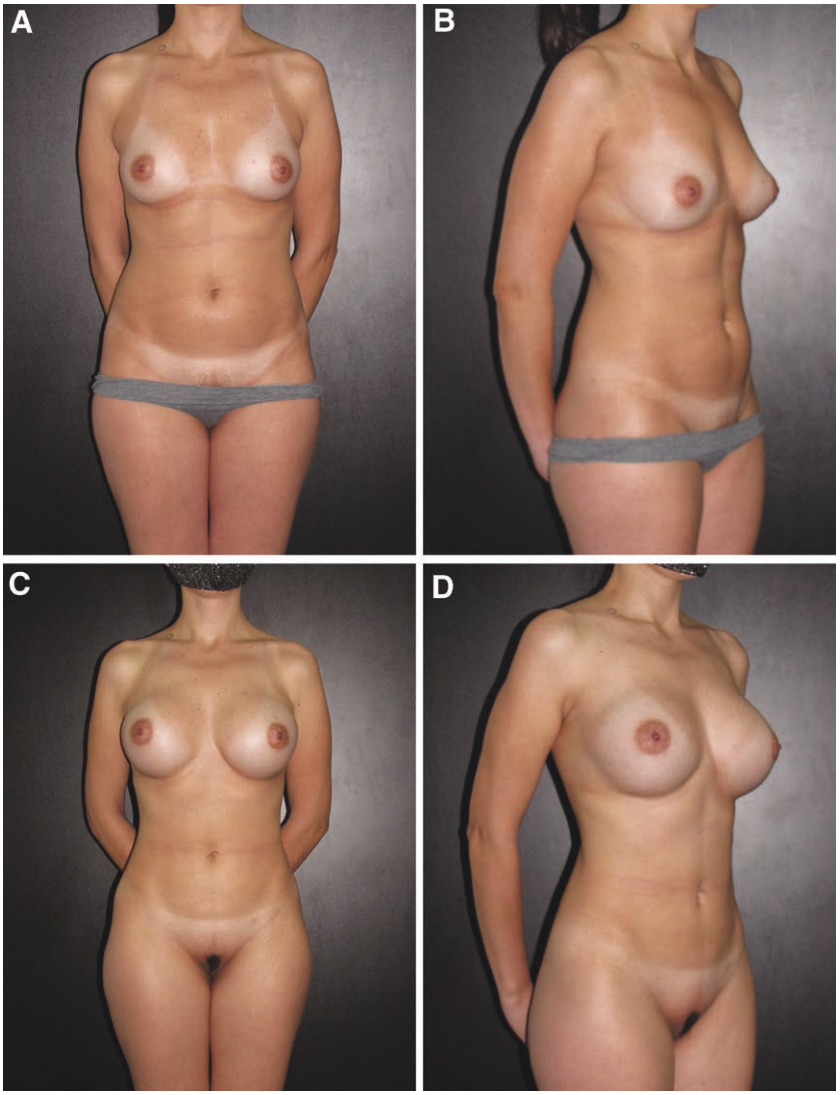

Fig. 5. Thirty-four-year-old patient. A total of 480 mL of fat was removed from the abdomen using PAL. A and B, Preoperative. C and D, Sixteen months postoperatively.

and tissue contraction. This allows for greater efficacy and safety compared with bulk devices, which operate through continuous centrifugal energy delivery and are more likely to affect adjacent tissues.[2,3,11–13,23]

The primary objective of body-contouring surgery is to reduce areas of excess volume while achieving adequate contraction of the skin envelope with the least possible scarring. In our study, the rate of abdominoplasty was lower in the helium RF group (30% versus 67.1%). However, owing to the retrospective design and lack of standardized criteria for abdominoplasty, this finding must be interpreted cautiously. It is possible that the patients in the conventional liposuction group presented with greater skin laxity at baseline, necessitating excisional procedures that introduce potential selection bias. Therefore, although the lower abdominoplasty rate may suggest improved skin contraction with helium plasma RF, we cannot conclude causality based on this dataset.

The optimal candidates for helium plasma RF are typically individuals with mild to moderate skin laxity who may benefit from enhanced tissue contraction without requiring skin excision. It may be less beneficial in patients with poor skin quality, advanced dermatochalasis, or extensive fibrosis. In our clinical setting, selection criteria were based on physical examination findings, aesthetic goals, and patient preferences regarding scarring. These nonstandardized, surgeon-directed decisions introduce variability that may impact the outcomes observed. Although the data suggest favorable outcomes in the helium plasma RF group, they must be interpreted within the context of these potential selection biases.

Finally, several limitations must be acknowledged, including the retrospective and single-surgeon design, small and unequal sample sizes for subanalyses, lack of randomization, and industry funding support. Although Apyx Medical provided an investigator-initiated grant, the company had no role in study design, data collection, or

analysis. These factors inherently limit the generalizability of the findings. Future multicenter, prospective, randomized studies using standardized objective and patient-reported outcome measures are warranted to validate these findings.

CONCLUSIONS

Liposuction followed by treatment with helium plasma RF suggested favorable outcomes in patient-reported evaluation of excess skin and satisfaction with the abdomen, with lower rates of abdominoplasty and surgical revisions, larger aspirated volumes, and a complication rate equivalent to that of conventional liposuction. These findings suggest that helium plasma RF may enhance aesthetic outcomes following liposuction by both improving patient satisfaction with skin quality and enabling the removal of larger fat volumes, thereby potentially reducing the need for abdominoplasty or revision procedures. However, given the retrospective nature, single-surgeon design, nonrandomized patient selection, and limited subgroup sample sizes, further prospective controlled studies are needed to validate these observations.

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DISCLOSURES

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PATIENT CONSENT

Patients provided written consent for the use of their images.

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