RESEARCH PAPER

Ultrasound Lipolysis versus Cryo Lipolysis on Lipid Profile Levels in Centrally Obese Middle Aged Men

Mustafa Awad Ali[1], Mohsen Mohamed El Sayyad[2], Yasser Ramzy Lasheen[3], Abir Zakaria Mohamed[4] and Aida Amir Nassif[5]

[1]Physical Therapist, Department of Physical Therapy, Al Agouza Hospital, Cairo University, Egypt
[2] Professor of Physical Therapy, Department of Physical Therapy for Basic sciences, Faculty of Physical Therapy, Cairo University, Egypt Fr. Dean Faculty physical therapy Modern University
[3]Assistant Professor of Physical Therapy, Department of Physical Therapy for Basic sciences, Faculty of Physical Therapy, Cairo University, Egypt
[4]Professor of Internal Medicine, Faculty of Medicine, Cairo University, Egypt
[5]Lecture of Physical Therapy, Department of Physical Therapy for Basic sciences, Faculty of Physical Therapy, Cairo University, Egypt. Lecture of Physical Therapy, Faculty of Physical Therapy, Hertsfordshire University, Egypt

ABSTRACT

Background: abdominal fat is a strong predictor of metabolic problems, which in turn raise the risk of cardiovascular disease and other metabolic disorders. Objective: To compare the effect of ultrasound lipolysis versus cryolipolysis on lipid profile in middle age men.

Methods: Two experimental groups pre and post with control. sixty six male, with sedentary life style, body mass index (BMI) < 30 Kg\m2, ranged in age from 40 to 60 years old, and with localized abdominal fat, waist circumference more than 94 cm. The subjects randomized into three equal groups (experimental group A) received ultrasound lipolysis on abdominal area and low caloric diet (1200-1500 cal), for three months, the patient received 60-minute sessions every two weeks on the abdominal area. (experimental group B) received cryolipolysis on abdominal area and low caloric diet (1200-1500 cal), for three months, every subject had cryolipolysis done on the same area of their abdomen every two weeks. (control group C) received low caloric diet (1200-1500 cal). Body mass index, waist circumference, waist hip ratio, skinfold thickness and lipid profile were measured at baseline (T0) and post treatment (T1).

Results: All groups showed significant reductions in BMI, WC, WHR, skinfold thickness, cholesterol, TG, and LDL, with a significant increase in HDL levels. Group A showed significantly greater Group B and Group C. Group B also showed significantly greater than Group C.

Conclusion: The lipid profile (lower cholesterol, TG, and LDL levels, with increased HDL) and central obesity (WC, WHR, and ST) were both improved by using ultrasonic lipolysis and cryolipolysis, with the ultrasound lipolysis producing superior outcomes.

Keywords: Abdominal obesity, Ultrasound lipolysis , Cryolipolysis, Lipid profile.

How to cite this article: Ali MA, El Sayyad MM, Lasheen YR, Mohamed AZ, Nassif AA, Ultrasound Lipolysis versus Cryo Lipolysis on Lipid Profile Levels in Centrally Obese Middle Aged Men. Int J Drug Deliv Technol. 2026;16(14s): 624-633. DOI: 10.25258/ijddt.16.14s.71

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

The critical condition known as obesity is marked by a buildup of fat in the body that causes the weight to be a minimum of 20% higher than the ideal weight. The prevalence of obesity has more than tripled globally since 1980, largely as a result of people eating more sugar, carbs, and saturated fats and engaging in less physical activity. (1) Human obesity has more than tripled in recent decades as a result of a combination of factors, including a decline in physical activity and a rise in the intake of nutrient-poor, energy-dense foods rich in carbs, sugar, as well as saturated fats. (2)

Central obesity, which refers to men's excessive visceral fat accumulation around the abdomen and stomach, is a medical disorder that can have detrimental effects on health. Heart disease is closely associated with abdominal obesity. (3) In Egypt, obesity has become a growing public health crisis. According to the 2019 "100 Million Health" survey, approximately 39.8% of Egyptian adults are classified as obese (BMI 30 kg/m2), placing Egypt among the countries with the highest obesity rates globally. Furthermore, a previous study found that 80.6% of obese individuals reported experiencing LBP, in contrast to less than 60% among individuals with normal BMI. (4)

**Author for Correspondence: Mustafa Awad Ali*

Ultrasonic abdominal lipolysis is a non-invasive, efficacious approach to aesthetic medicine that reduces localized fat and cellulite without surgery. The method involves using ultrasonic vibrations, which propagate through a medium like a liquid or solid, to reduce waist circumference as well as blood cholesterol. (5)

The FDA has authorized cryolipolysis, a method for decreasing subcutaneous fat that involves reducing the temperature of subcutaneous adipose tissue using controlled cooling, in order to eliminate adipose cells selectively, without damaging the skin or neighboring tissues. (1) Cryolipolysis decreases subcutaneous fat thickness and triggers the death of fat cells by apoptosis. Subcutaneous fat loss in the flanks, thighs, and belly is possible because adipocytes are more heat-sensitive than other cell types. (6)

Incorporating cryolipolysis into a low-calorie diet can enhance body composition measures like BMI, waist-to-hip ratio, and subcutaneous fat tissue thickness, while simultaneously enhancing lipid profile and liver enzymes. (1) One noninvasive method of body contouring that is gaining popularity is high-intensity focused ultrasound (HIFU). Adipocytes as well as fat membranes are histologically degraded, and there is a significant decrease in subcutaneous adipose tissue following HIFU therapy, according to many clinical investigations. Similarly, HIFU has been shown to be both safe and effective in preclinical investigations, which have also isolated two mechanisms: heat-induced apoptosis and sonic cavitation. (7)

Cryolipolysis has been shown to be an effective method for reducing localized fat, according to many research. The findings of the majority of the research that were evaluated are supported by this. Results concerning the decrease of localized fat were found to be statistically significant in four out of five papers when comparing the control group with experimental group individuals who had cryolipolysis therapy. (8)

The aim of this study was to compare the impact of ultrasound lipolysis versus cryolipolysis on lipid profile in middle age men.

METHODS

Design

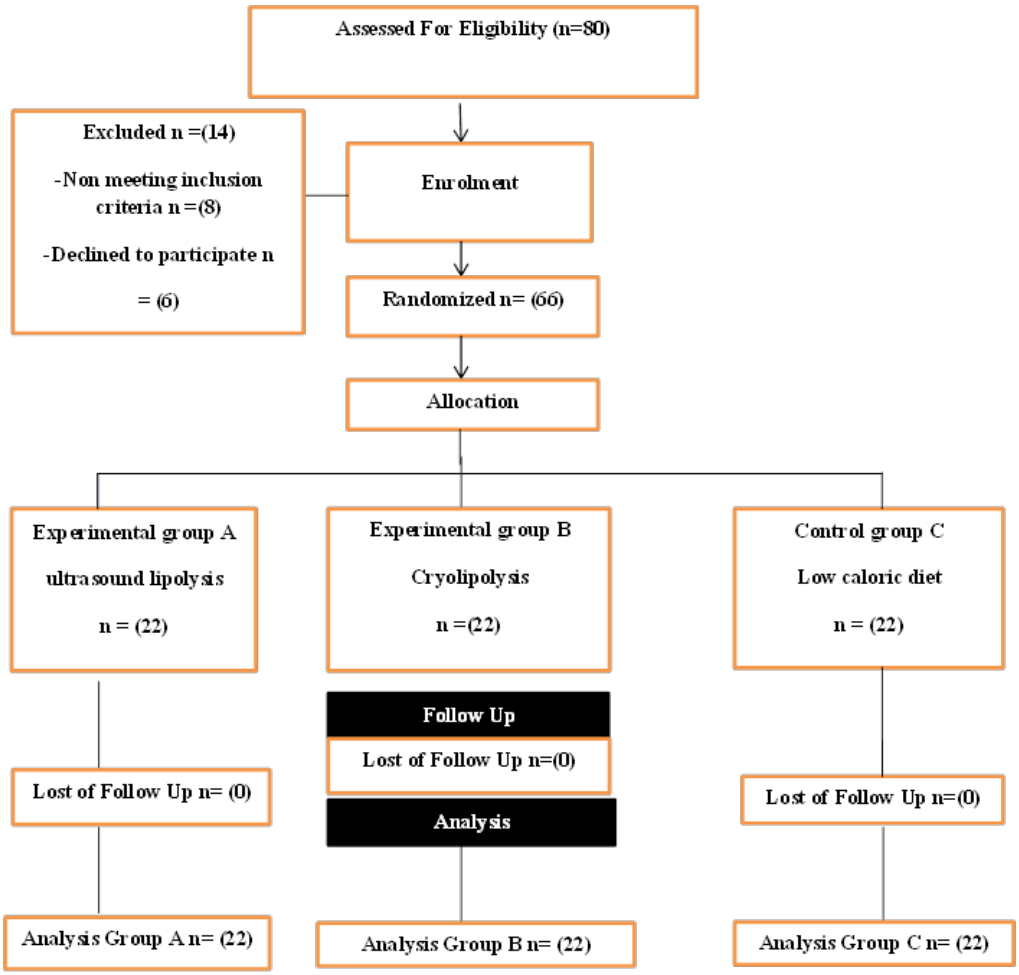
The study design was two experimental groups pre and post with control.

Ethical considerations and registration

This study was done under the ethical committee No: P.T.REC/012/004363, Faculty of Physical Therapy, Cairo University, and registered at Clinical Trail with reference number: NCT06658639. Furthermore, all subjects provided their informed consent before any publishing of their personal information was made. The study was conducted at the outpatient physiotherapy clinic of El Alagoza hospital in the period between March 2024 to March 2025.

Participants

Eighty Participants randomly selected from Cairo governorate according to Priori G-power test analysis equation, The participants were examined for study eligibility, fourteen Participants were excluded, eight Participants did not meet inclusion criteria, six declined to participate (Fig. 1).



Obese men with middle-aged (9) with central obesity (9), whose BMI greater than 30 Kg \m2, Waist circumference will be >94 cm (5)and Waist to hip ratio greater than 0.9 (3) participated in the study. The participants were excluded from the study if they met one of the following criteria: chronic respiratory disorders and cardiovascular problem (1), diabetic patients (10), presence of skin diseases in abdominal regions that prevent the use of ultrasound or cryolipolysis therapy (1), kidney or liver diseases (12), tumor diseases (13), lesions of higher center leading to obesity (14), history of active or chronic infectious, autoimmune disease (15), history of abdominal surgeries (10).

Randomization

66 male were randomly assigned into 3 groups by closed opaque envelops with different integers presented by the Priori in a folded index cards .

Interventions

(experimental group A) received ultrasound lipolysis on abdominal area and low caloric diet (1200-1500 cal), for three months, every subject had ultrasound lipolysis done on abdomen every two weeks. Luvitra device is a noninvasive technique of localized fat reduction . The device model is ESM-8100MO manufactured by Dayang (Korea), consumption power is 60 W, frequency 50-60 Hz and voltage 220-240 V. was used for ultrasound cavitation. This device emits low-frequency ultrasound pulsed waves ranging from 30 to 70 khz through a transducer of 45 mm diameter at a power of 5watts/cm2. (experimental group B) received cryolipolysis on abdominal area and low caloric diet (1200-1500 cal). Each subject received a cryolipolysis session on abdomen every 2 weeks for 3 months.) Lipocool Cryolipolysis is a noninvasive technique of localized fat reduction . Controlled cold exposure is performed in the selective destruction of fat cells. Temperature of -5 0 C, was applied on the hypogastrium area, 5 cm below the umbilicus. The device manufactured by Dayang (Korea), consumption power is 600 W, frequency 50-60 Hz and voltage 220-240 V. Integrated Technology by Cryo, Vacuum and LED Strong Cooling lipolysis system. Two powerful cooling Peltiers attached to the hand piece, automatically control the cooling temperature. Variable vacuum function controllable vacuum level: step 1 (low) to step 4 (high). (control group C) received low caloric diet (1200-1500 cal).

OUTCOME MEASURES

weight and height:

-Weight: Patients wear light cloths standing facing the weight scale on the platform of weight measuring scale (weight was recorded in Kg). -Height: patients standing

back to graduated longitudinal arm and measure from vertex to the feet (height was measured in cm)

Body mass index:
It was calculated for each patient. The body weight was divided by the patient's height's square to calculate his BMI. The same procedures were applied to all patient.

waist circumference:
A non-stretching measuring tape that is used to find the waist circumference at the midway in line between the lowest border of the last felt rib as well as the highest point of the iliac crest. All of the patients were standing comfortably, with both feet close together and both arms next to their bodies. (32)

Waist hip ratio :
The waist girth was measured as described by Abotaleb et al the hip girth was evaluated at the widest point (gluteal muscles) at the level of greater trochanter by using Plastic tape. The girth of the waist was divided by the girth of the hip of each patient. (34)

Abdominal skin thickness:
The thickness of the skinfold in the abdomen may be measured using a caliper. the area where the caliper tongs are positioned are used to draw subcutaneous fat away from the muscle. The fold pulling motion for males is performed in a vertical direction, two centimeters away from the umbilicus. (16)

lipid profile:
Cholesterol, triglycerides, low density lipoprotein as well as high density lipoprotein were assessed through the lipid profile analysis. A blood sample was collected from each patient at the clinical pathology laboratory. A 12-hour fast was required of all patients before blood samples were taken, the samples were collected from the anticubital vein (17).

DATA ANALYSIS
The normality of the data was tested by Shapiro-Wilk test, SPSS version 27 for windows (IBM SPSS, Chicago, IL, USA) was used to analyze the study data, the physical characteristics of participants in different groups were assessed by ANOVA, the homogeneity of variances among groups was tested using Levene's test, while the differences between baseline T0 and posttreatment T1for the three groups were computed by mixed MANOVA. Subsequent multiple comparisons were subjected to post hoc testing utilizing the Bonferroni correction. The level significance criterion of $p < 0.05$ was established for all statistical tests.

RESULTS

- Subject characteristics:
A, B, and C groups' participants' characteristics are shown in Table (1). Age, weight, height, and body mass index did not differ significantly ($p > 0.05$) amongst the groups.

Table 1. Basic characteristics of participants.

	Group A	Group B	Group C	p-value
	mean ± SD	mean ± SD	mean ± SD	
Age (years)	46.68 ± 5.39	46.82 ± 5.24	47.50 ± 5.59	0.87
Weight (kg)	101.00 ± 6.50	101.50 ± 6.49	100.50 ± 5.97	0.87
Height (cm)	174.86 ± 5.43	175.73 ± 5.86	174.73 ± 6.42	0.83
BMI (kg/m²)	33.04 ± 1.70	32.88 ± 1.78	32.94 ± 1.62	0.96

SD, standard deviation; p value, Probability value

Impact of treatment on BMI, WC, WHR, skinfold thickness, cholesterol, TG, LDL, and HDL:
A significant interaction between treatment and time was shown by the two-way mixed MANOVA ($F = 55.26$, $p = 0.001$, $\eta p^2 = 0.88$). The main impact of time was statistically significant ($F = 2299.35$, $p = 0.001$, $\eta p^2 = 0.99$). $F = 11.65$, $p = 0.001$, $\eta p^2 = 0.63$ indicates a significant main impact of treatment.

Within group comparison
All groups showed significant reductions in BMI, WC, WHR, and skinfold thickness in comparison with pre treatment ($p < 0.001$). (Table 2).

Similarly, each group demonstrated significant reductions in cholesterol, TG, and LDL, with a significant increase in HDL levels ($p < 0.001$). (Table 3).

Between group comparison
Comparison between groups post treatment showed that there were no significant differences in BMI among the groups post treatment ($p > 0.05$; $\eta p^2 = 0.01$).

Compared to Group B ($p < 0.01$) and Group C ($p < 0.00$), Group A had significantly greater decreases in WC, WHR, and skinfold thickness in relation to central adiposity. Additionally, Group B demonstrated significantly greater decreases compared to Group C ($p < 0.05$). The effect sizes were moderate to large ($\eta p^2 = 0.32$-0.68),

For the lipid profile, Group A had significant reduction in cholesterol, TG, LDL, and increased HDL compared with Groups B ($p < 0.01$) and Group C ($p < 0.001$). Group B also improved significantly compared with Group C across all lipid measures ($p < 0.001$). (Table 4).

Table 2. Mean BMI, WC, WHR, and skinfold thickness pre and post treatment of group A, B and C:

	Group A	Group B	Group C
	mean ± SD	mean ± SD	mean ± SD

BMI (kg/m²)			
Pre treatment	33.04 ± 1.70	32.88 ± 1.78	32.94 ± 1.62
Post treatment	28.96 ± 1.53	28.57 ± 1.63	28.82 ± 1.79
MD (95% CI)	4.08 (3.76: 4.39)	4.31 (4.00: 4.62)	4.12 (3.81: 4.43)
	p = 0.001	***p = 0.001***	***p = 0.001***
WC (cm)			
Pre treatment	102.82 ± 6.84	102.73 ± 6.77	103.05 ± 5.73
Post treatment	87.55 ± 5.38	92.41 ± 6.15	96.95 ± 5.59
MD (95% CI)	15.27 (13.96: 16.59)	10.32 (9.00: 11.63)	6.10 (4.78: 7.40)
	p = 0.001	***p = 0.001***	***p = 0.001***
WHR			
Pre treatment	0.93 ± 0.02	0.94 ± 0.02	0.93 ± 0.02
Post treatment	0.82 ± 0.02	0.85 ± 0.02	0.89 ± 0.03
MD (95% CI)	0.11 (0.11: 0.12)	0.09 (0.08: 0.09)	0.04 (0.04: 0.06)
	p = 0.001	***p = 0.001***	***p = 0.001***
Skinfold thickness (mm)			
Pre treatment	31.18 ± 2.26	31.36 ± 2.17	31.05 ± 2.34
Post treatment	23.00 ± 1.77	25.64 ± 2.01	28.50 ± 2.11
MD (95% CI)	8.18 (7.81: 8.56)	5.72 (5.35: 6.10)	2.55 (2.17: 2.92)
	p = 0.001	***p = 0.001***	***p = 0.001***

SD, Standard deviation; MD, Mean difference; CI, Confidence interval; p value, Probability value

Table 3. Mean cholesterol, TG, LDL and HDL pre and post treatment of group A, B and C:

	Group A	**Group B**	**Group C**
	mean ± SD	**mean ± SD**	**mean ± SD**
Cholesterol (mg/dl)			
Pre treatment	244.14 ± 5.83	243.95 ± 4.57	241.95 ± 4.49
Post treatment	200.09 ± 5.55	221.59 ± 5.44	232.00 ± 3.49
MD (95% CI)	44.05 (41.50: 46.59)	22.36 (19.82: 24.91)	9.95 (7.41: 12.50)
	p = 0.001	***p = 0.001***	***p = 0.001***
TG (mg/dl)			
Pre treatment	188.77 ± 7.14	189.64 ± 7.36	187.09 ± 8.02
Post treatment	160.27 ± 6.98	166.14 ± 6.68	175.32 ± 7.23
MD (95% CI)	28.5 (27.10: 29.90)	23.5 (22.10: 24.90)	11.77 (10.38: 13.17)
	p = 0.001	***p = 0.001***	***p = 0.001***
LDL (mg/dl)			
Pre treatment	180.86 ± 6.87	181.36 ± 6.86	181.05 ± 5.47
Post treatment	157.09 ± 7.12	164.45 ± 5.49	171.32 ± 5.07
MD (95% CI)	23.77 (22.18: 25.37)	16.91 (15.32: 18.50)	9.73 (8.13: 11.32)
	p = 0.001	***p = 0.001***	***p = 0.001***
HDL (mg/dl)			
Pre treatment	35.23 ± 4.02	35.45 ± 3.69	36.32 ± 3.23
Post treatment	57.41 ± 3.10	54.45 ± 4.11	45.68 ± 3.18
MD (95% CI)	-22.18 (-23.21: -21.15)	-19 (-20.03: -17.97)	-9.36 (-10.39: -8.33)
	p = 0.001	***p = 0.001***	***p = 0.001***

SD, Standard deviation; MD, Mean difference; CI, Confidence interval; p value, Probability value

Table 4. Comparison of BMI, WC, WHR, skinfold thickness, cholesterol, TG, LDL, and HDL between group A, B and C post treatment.

Outcome	**Group A vs B**		**Group A vs C**		**Group B vs C**		**ηp²**
	MD (95% CI)	**p value**	**MD (95% CI)**	**p value**	**MD (95% CI)**	**p value**	
BMI (kg/m²)	0.39 (-0.81: 1.58)	0.72	0.14 (-1.06: 1.33)	0.96	-0.25 (-1.44: 0.94)	0.87	0.01
WC (cm)	-4.86 (-9.00: -0.73)	0.01	-9.40 (-13.55: -5.27)	0.001	-4.54 (-8.68: -0.41)	0.02	0.32
WHR	-0.03 (-0.05: -	0.001	-0.07 (-0.08: -	0.001	-0.04 (-0.05: -	0.001	0.68

	0.02)		0.05)		0.02)		
Skinfold thickness (mm)	-2.64 (-4.06: -1.21)	0.001	-5.50 (-6.93: -4.07)	0.001	-2.86 (-4.29: -1.44)	0.001	0.58
Cholesterol (mg/dl)	-21.50 (-25.06: -17.94)	0.001	-31.91 (-35.47: -28.35)	0.001	-10.41 (-13.97: -6.85)	0.001	0.88
TG (mg/dl)	-5.87 (-10.91: -0.82)	0.01	-15.05 (-20.09: -10.00)	0.001	-9.18 (-14.22: -4.14)	0.001	0.45
LDL (mg/dl)	-7.36 (-11.68: -3.05)	0.001	-14.23 (-18.54: -9.91)	0.001	-6.87 (-11.18: -2.55)	0.001	0.50
HDL (mg/dl)	2.96 (0.43: 5.48)	0.01	11.73 (9.20: 14.26)	0.001	8.77 (6.24: 11.30)	0.001	0.68

MD, Mean difference; CI, Confidence interval; p value, Probability value; ηp^2, Partial Eta Squared.

DISCUSSION

This study was designed to compare the effect of ultrasound lipolysis versus cryolipolysis on lipid profile in middle age men.

The analysis of the results of the current study revealed a significant improvement in body mass index (BMI), waist circumference (WC), waist hip ratio (WHR), skinfold thickness, cholesterol, triglycerides (TG), low density lipoprotein (LDL), and high density lipoprotein (HDL) in groups (A) , (B) and (C).

Comparison between groups post treatment showed that there were no significant differences in BMI among the groups post treatment .For central adiposity, Group A showed significantly greater reductions in WC, WHR, and skinfold thickness compared with both Group B ($p < 0.01$) and Group C ($p < 0.00$). Group B also showed significantly greater reductions than Group C ($p < 0.05$). For the lipid profile, Group A had significant reduction in cholesterol, TG, LDL, and increased HDL compared with Groups B ($p < 0.01$) and Group C ($p < 0.001$). Group B also improved significantly compared with Group C across all lipid measures ($p < 0.001$).

There are many literature data supporting the notion that, abdominal obesity result in alterations in lipids (increased levels of triglycerides and very-low density lipoproteins, and low level of HDL-C), blood pressure, clotting, fibrinolysis as well as inflammation, resulting in endothelial dysfunction along with atherosclerosis.(2)

Consistent with our findings, Siam M et al. (2022) used ultrasonic cavitation to identify statistically significant variations in hip-to-waist ratio as well as subcutaneous fat thickness.(18)

Separate research by El-Din K et al., 2023 examined UC effects on abdominal adiposity in female adolescents (17–21 years old, BMI 30–35 kg/m²). Group A received abdominal UC twice weekly for 30 minutes, alongside 30 minutes of moderate-intensity aerobic exercises and low caloric diet, while Group B implemented aerobic training with calorie-restricted diet. The study found that Group A experienced significantly superior decreases in weight, BMI, WC, fat thickness, WHR, body fat percentage, and trunk adiposity versus Group B, demonstrating the effectiveness of combining UC with exercise and dietary intervention in reducing abdominal obesity in adolescents.(13)

In another study, Kiedrowicz et al., 2022 studied 60 women aged 25–35 years with abdominal obesity (BMI >30 kg/m²), randomized into UC, radiofrequency (RF), or combined (RF/UC) treatment groups. Participants received 10 sessions, three times per week over 3–4 weeks, with each session consisting of a 20-minute abdominal application. Anthropometric and biochemical parameters were measured before treatment, after 10 sessions, and at 6-month follow-up. The study concluded that both ultrasound and radiofrequency treatments, especially when combined, effectively reduced abdominal fat and improved body contour, with effects maintained at 6 months.(19)

The recent study's findings corroborated those of Abdelaal N et al., 2022, which indicated that compared to cryolipolysis, cavitation combined radiofrequency resulted in more significant improvements in waist circumference, skinfold, as well as BMI.(20)

Also, Amr et al. 2016 conducted a related investigation examining UC and cryolipolysis impacts on central adiposity among thirty participants (fifteen males and fifteen females) between forty-five and fifty-five years of age. Group A received eight UC sessions over one month, while Group B underwent a single cryolipolysis session during the same period. Both interventions resulted in significant decreases in BMI, abdominal fat percentage, and WC, with cryolipolysis showing slightly greater improvements. These findings indicate that UC can effectively reduce central obesity, though cryolipolysis may offer marginally enhanced outcomes.(21)

Furthermore, the study by Yousef et al., 2019 included 50 prediabetic obese female patients aged 25–40 years, presenting BMI measurements of 30–35 kg/m² and WC exceeding 88 cm. The researchers divided subjects into two groups: the control group received calorie-restricted nutrition (500 kcal daily) and aerobic training thrice weekly for twelve weeks, whereas the experimental group

received the same diet and exercise plus UC therapy twice per week for 6 weeks. The study concluded that adding UC significantly enhanced weight loss, reduced BMI, WHR, and skinfold thickness, and improved fasting/postprandial glucose and HbA1c compared to the control group.(22)

Ultrasound cavitation reduced abdominal fat thickness at three levels: above as well as below the umbilicus by 5 cm, which is consistent with the findings of Assim Y., 2020, who stated that it is a successful strategy for the treatment of abdominal obesity.(14)

This study's findings corroborated those of Oh et al., 2020, which found that Cryolipolysis, when performed with modern, more comfortable applicators, is a safe, quick, and effective way to reduce excess fat in problem areas such the flanks, back, and legs. For Asian individuals with extra fat, it's a good treatment choice.(23)

Multiple recent studies have shown that cryolipolysis is a safe and effective way to reduce subcutaneous fat in different areas of the body. According to research by Choi SY et al. (2022), ultrasound imaging of the abdomen subcutaneous fat layer revealed a 20% (2.0 mm) decrease on average.(10)

Cryolipolysis has developed as a potential nonsurgical method for body contouring because to its capacity to target and decrease localized adipose tissue, as observed by Kania B 2023. This study's findings corroborate this finding. Patients now have a viable alternative to invasive procedures that need a long recovery time or surgery to achieve their target fat reduction. Objective methods of quantification include fat caliper measurements, ultrasound evaluations, and 3D imaging; subjective methods include patient satisfaction ratings, clinical observations, and investigator evaluations; and both quantitative and qualitative methods support the idea that cryolipolysis reduces the number of adipocytes in the treated area.(6)

Cryolipolysis was shown by Resende L. et al. 2022 to be a safe, effective, and well-tolerated method of localized fat reduction; most patients reported being happy with the results. But since there aren't enough high-quality publications, further randomized controlled trials are needed.(8)

In 2023, Vignoli F and Mármol GV discovered that with cryolipolysis therapy, the fold thickness significantly decreased (−69.91 ± 12.55%). The fold thickness prior to treatment was 35.33 ± 8.41 mm, and after treatment it was 10.69 ± 5.27 mm. Posttreatment pain was noted in 1.70% of cases, and paradoxical adipose hyperplasia in 0.09%. Other adverse effects were minimal. (24)

Cryolipolysis therapy is another effective way to reduce fat, according to a study by Hetzel et al., 2023. After 1-3 sessions, the average thickness decrease of fat tissue in the trials that were evaluated was 2–5.1 mm. (25)

Research on the efficacy of cryolipolysis for the reduction of abdomen fat was conducted by Faruga-Lewicka W et al. in 2025. Cryolipolysis, the study found, is a safe way to reduce localized fat, particularly in the abdominal region. (26)

Lopes-Martins et al. 2023 examined a similar subject. Fifteen women who were overweight or obese participated in the trial and each received three cryolipolysis treatments in a row. On average, participants lost 4.1 kg of body fat and 0.7 points off their body mass index. Before and after therapy, the researchers also checked the patients' cholesterol levels. On average, total cholesterol decreased by 15.7 mg/dL, and LDL fraction cholesterol decreased by 10.2 mg/dL, according to the analysis.(27)

The result showed that Cryolipolysis exhibited a significant reduction in post weight, waist circumference, BMI, and central adiposity compared to pre-evaluation. These results agreed with De Marco et al., 2022 who studied cryolipolysis sessions on flanks and abdomen in 175 individuals for four sessions and concluded that the effects of cryolipolysis may be attributed to its selective targeting of subcutaneous fat cells through controlled cooling.(28)

Contrarily, research by Costa et al., 2022 showed that cryolipolysis performed in a single session over the course of 30 days might affect many body areas. Twenty-four women ranging in age from twenty-something to fifty-nine showed no changes in body composition, anthropometric measures, or inflammatory markers after undergoing cryolipolysis. Costa et al. only studied for a short period of time, which may explain why our results differ from theirs. The benefits of subcutaneous fat reduction are slower to take effect, taking up to 90 days. (29)

Contrarily, Falster et al., 2020 did not find any significant changes among the groups at any of the follow-up time points when they examined the impacts of a single cryolipolysis session on the thickness of the lower abdomen adipose layer (visceral fat) of 44 healthy women at thirty, sixty, and ninety days. Falster et al. only examined at the effects of a single cryolipolysis treatment; they didn't include a plan for lifestyle changes or an exercise program, which might explain why our results are different.(15)

This study's findings corroborated those of Ingargiola et al. (2015), who demonstrated that cryolipolysis offers an attractive alternative to liposuction and other invasive procedures, as well as a potential option for nonsurgical fat removal and body reshaping. When applied to localized adiposities, this method decreases fat significantly and appears to be safe in the short term with few adverse effects.(30)

This study's findings corroborated those of El Desouky et al. (2016), who conducted a 2-month cryolipolysis study and discovered a 5.8% weight loss, a 5.83% decline in the body mass index, a 17.41% decline in supra iliac subcutaneous fat, and a significant decline in waist circumference.sixteen (16)

While Lee et al. (2013) discovered no statistically significant difference in the measured levels of thigh fat

using cryolipolysis on Korean overweight women for 12 weeks, our findings show that there is a difference. Cryolipolysis did not effectively decrease thigh fat over a 12-week period.(33)

Additionally, our findings contradict Reda K et al., 2025 both cryolipolysis and ultrasonic cavitation had the same impact on lowering postmenopausal abdominal adiposity by decreasing BMI, WC, hip circumference, WHR, and SFT. (5)

Abotaleb et al., 2019 examined 30 centrally obese individuals (45–55 years old, BMI > 25 kg/m2) and evaluated the effects of ultrasonic cavitation and cryolipolysis on BMI, WC, as well as abdominal fat percentage (AFF). Cryolipolysis and cavitation both improved body contouring, although neither method was clearly better than the other. (34)

The recent study was limited by

1. The physical and psychophysiological factors which might effect the patient's performance and response.

2. Environmental factors which might affect the patient's response.

CONCLUSIONS

Both ultrasound lipolysis and cryolipolysis were effective in improving the waist circumference, waist-hip ratio and skin fold measurements and lipid profile in centrally obese participants with superior results in ultrasound lipolysis than cryolipolysis. These results may be valuable for physiotherapists to advise their patients on the most probable technique that may work best to reduce central body fat and avoid imposing any additional costs associated with dual management.

REFERENCE

1. Abdelaal NM, Elerian AE, Elmakaky AM, ALhamaky DMA. (2020): Systemic effects of cryolipolysis in central obese women. Lasers Surg Med ;52(10):971–978.
2. Ravindran R, Pizzol D, Rahmati M. (2025): Cryolipolysis and associated health outcomes, adverse events, and satisfaction: A systematic review and meta-analysis. Obesity Reviews.; 26(8): e13925. doi:10.1111/obr.13925.
3. Aboulghate M, Aliaa E, Ibrahim E, Nabil E, Elshishiney G, Abul-Magd E, Elezbawy B, Ahmad F, Sherif A and Zoltán V. (2021): The Burden of Obesity in Egypt. Front. Public Health https://doi.org/10.3389/fpubh.718978.
4. Taha MM, Aneis YM, Mohamady HM, S A A, Elsayed SH. (2021): Effect of focused ultrasound cavitation augmented with aerobic exercise on abdominal and intrahepatic fat in patients with non-alcoholic fatty liver disease: A randomized controlled trial. PLoS One. 2021 Apr 28;16(4):e0250337. doi: 10.1371/journal.pone.0250337. PMID: 33909662; PMCID: PMC8081198.
5. Reda K, Awad M, Abo Elanin M, El Ashmawy D. (2025): Effect of Cryolipolysis Versus Ultrasound Cavitation on Post-Menopausal Abdominal Adiposity. The Egyptian Journal of Hospital Medicine, 100(1), 2894-2899. doi: 10.21608/ejhm.2025.440604.
6. Kania B and Goldberg DJ. (2023): Cryolipolysis: A promising nonsurgical technique for localized fat reduction. J Cosmet Dermatol. 2023 Nov;22 Suppl 3:1-7. doi: 10.1111/jocd.16039. PMID: 37988716.
7. Young G, Ka R, Yoon H, Hye S and Kwang H. (2023): Review of high intensity focused ultrasound for lipolysis: clinical and preclinical studies. Med Lasers;12(3):147-152 https://doi.org/10.25289/ML.23.034 pISSN 2287-8300・eISSN 2288-0224
8. Resende L, Noites A, Amorim M. (2022): Application of cryolipolysis in adipose tissue: A systematic review. J Cosmet Dermatol. 2022 Oct;21(10):4122-4132. doi: 10.1111/jocd.15265. Epub Aug 9. PMID: 35869825.
9. Hamid Reza Mohammadi, Ebrahim Khoshnam, Maryam Koshki, Mohammad Sadegh Khoshnam and Elham Karampour. (2022): The Effect of 12 Week of Aerobic Training on Homocysteine, Lipoprotein A and Lipid Profile Levels in Sedentary Middle-aged Men. International Journal of Preventive Medicine, Vol 5, No 8.
10. Choi SY, Park JW, Koh YG, Jung YJ, Huh YJ, Ko EJ, Yoo KH, Seok J, Kim SY, Jue MS, Ko JY, Kim BJ. (2022): Cryolipolysis for abdominal subcutaneous fat reduction: A prospective, multicenter, single arm, clinical study. Dermatol Ther. 2022 Sep;35(9):e15717. doi: 10.1111/dth.15717. Epub 2022 Jul 28. PMID: 35837791.
11. Mohamed H, Abir Z, Yasser R, and Mustafa A. (2017): Efficacy of ultrasonic lipolysis on blood cholesterol level in centrally obese women. International Journal of Physiotherapy and Research Int J Physiother Res, Vol 5(4):2164-70. ISSN 2321-1822
12. Blumenthal JA., Babyak MA., Ilinderliter A., Watkins L L., Craighead L., Lin PH. and Sherwood A. (2021): Effects of the DASH diet alone and in combination with exercise and weight loss on blood pressure and cardiovascular biomarkers in men and women with high blood pressure: the ENCORE study. AMA Arch Intern Med; 170(2): 126-135.
13. El-Din K, El-Kosery M, El Refaye E. (2021): Effect of ultrasonic cavitation on abdominal obesity in adolescent females: A randomized controlled trial. Turkish J Physiother Rehabil., 32(3):14717.
14. Assim Y, El-Aziz K, Elrefaye G and Youssef A. (2020): Effect of ultrasound cavitation versus radiofrequency on abdominal fat thickness in

postnatal women. Eurasian Journal of Biosciences,14. 3337-3347

15. Falster M, Schardong J, Santos DPD, (2020) : Effects of cryolipolysis on lower abdomen fat thickness of healthy women and patient satisfaction: a randomized controlled trial. Braz J Phys Ther. 2020; 24: 441-8.
16. ELdesoky MTM, Abutaleb EEM, Mousa GSM. (2016): Ultrasound cavitation versus cryolipolysis for non-invasive body contouring. Australasian Journal of Dermatology;57(4):288–93.
17. Bonaca MP, Nault P, Giugliano RP. (2023): Low-density lipoprotein cholesterol lowering with evolocumab and outcomes in patients with peripheral artery disease: insights from the FOURIER Trial (Further Cardiovascular Outcomes Research with PCSK9 Inhibition in Subjects with Elevated Risk). Circulation 2018; 137: 338–50.
18. Siam M, Elkosery S, Abohashim M, and Mohamed D. (2022): Effect of ultrasound fat cavitation versus faradic stimulation on abdominal adiposity during postnatal period section. International Journal of Health Sciences, 6(S6), 27792787.https://doi.org/10.53730/ ijhs. v6nS6.10119.
19. Kiedrowicz M, Duchnik E, Wesolowska J. (2022): Early and long-term effects of abdominal fat reduction using ultrasound and radiofrequency treatments. Nutri., 14(17):3498-3504.
20. Abdelaal NM, Mostafa MSEM, Saweres JW, Ghait RS. (2022): Cavitation and radiofrequency versus cryolipolysis on leptin regulation in central obese subjects: A randomized controlled study. Lasers Surg Med. 2022 Sep;54(7):955-963. doi: 10.1002/lsm.23555. Epub 2022 Apr 28. PMID: 35481595.
21. AMR N, AKRAM A, HEBA A, and MARRY W. (2016): Ultrasound Cavitation Versus Cryolipolysis on Central Obese Patients. Australasian Journal of Dermatology 57, 288–293.
22. Yousef J, Al-Kabalawy A, Draz H et al. (2019): Effect of ultrasound cavitation on weight reduction for prediabetic obese patients. Med J Cairo Univ., 87(2):909-917.
23. Oh CH, Shim JS, Bae KI and Chang JH. (2020): Clinical application of cryolipolysis in Asian patients for subcutaneous fat reduction and body contouring. Archives of Plastic Surgery 47(1):62-69.
24. Vignoli F, Mármol GV. (2023): Cryolipolysis for fat reduction using Cooltech® Define technology: A large-sample retrospective clinical study. J Cosmet Dermatol. 2023 Nov;22 Suppl 3:15-24. doi: 10.1111/jocd.15981. Epub 2023 Aug 31. PMID: 37654091
25. Hetzel J, Awad N, Bhupalam V, and Nestor M, (2023): Cryolipolysis in the United States-Review of the Clinical Data," Journal of Cosmetic Dermatology 22 (2023): 8–14, https:// doi. org/ 10. 1111/ jocd. 16029.
26. Faruga-Lewicka W, Staśkiewicz-Bartecka W, Kardas M. (2025): Evaluation of the Efficacy and Safety of Cryolipolysis in Reducing Local Adipose Tissue in Women-A Randomized Pilot Study. J Cosmet Dermatol. Apr;24(4): e70149. doi: 10.1111/jocd.70149. PMID: 40202106; PMCID: PMC11980024.
27. Lopes-Martins, L. V. Barbosa, M. M. B. Sousa, (2024): The Effects of Body Cold Exposure (Cryolipolysis) on Fat Mass and Plasma Cholesterol," Life 14, no. 9 (2024): 1082, https:// doi. org/ 10. 3390/ life1 4091082.
28. De Marco M, Arbieto ERM, Da Roza TH, (2022): Effects of visceral manipulation associated with pelvic floor muscles training in women with urinary incontinence: A randomized controlled trial. Neurourol Urodyn ; 41: 399-408.
29. Costa ADSD, Oliveira ASDSS, Brito AKDS, Lopes LAR, Primo MGS, Sales ALCC, Santos MAPD, Barros NVDA, Moura-Filho OF, Silva JKMD, Moura EIM, Lucarini M, Durazzo A, Arcanjo DDR, Martins MDCCE. (2022): Cryolipolysis on More than One Body Area Increases Lipid Peroxidation without Changing Lipid Profile and Inflammatory Markers. Biology (Basel). 2022 Nov 23;11(12):1690. doi: 10.3390/biology11121690. PMID: 36552200; PMCID: PMC9774456.
30. Ingargiola MJ, Motakef S, Chung MT, Vasconez HC and Sasaki G H. (2015): Cryolipolysis for Fat Reduction and Body Contouring: Safety and Efficacy of Current Treatment Paradigms, plastic and Reconstructive Surgery. 135 (6): 1581–1590.
31. Mostfa SM. and El Shafey M. (2016): Cryolipolysis versus laser lipolysis on adolescent abdominal adiposity. Lasers in Surgery and Medicine, 48 (4): 365-370.
32. Nasser HS, Ahmad OM and Al Adl AS. (2017): Impact of Cryolipolysis and Weight Loss on Waist Circumference and the Components of the Metabolic Syndrome. International Journal of Internal Medicine. 6(1):10-15.
33. Lee KR. (2013): Clinical efficacy of fat reduction on the thigh of Korean women through cryolipolysis. J Obes Weight Loss. 3: 1–5.
34. Abotaleb A, Sayed A, Abdeen A, Fawzy W. (2019): Ultrasound Cavitation Versus Cryolipolysis on Central Obese PatientsMed. J. 2019 Cairo Univ., Vol. 87, No. 1, March: 835-842

**Author for Correspondence: Mustafa Awad Ali*