

# Role of Non Surgical Treatments in Obesity

Manjiri Patankar\*

Cosmetic Physician, Instasculpt, Head Office, Mumbai, India

## What is Obesity

Obesity is a chronic condition defined by an excess amount body fat. A certain amount of body fat is necessary for storing energy, heat insulation, shock absorption, and other functions.

Men with more than 25% of fat and females with more than 30 % of fat are considered as obese.

## Statistics

- WHO projects that by 2015, approximately 2.3 billion adults will be overweight and more than 700 million will be obese.
- WHO estimates that there are 5 million overweight children worldwide

## Obesity facts

- Obesity means having excess body fat. For adults 35 and older, having a BMI greater than 30 is considered obese.
- Obesity is not just a cosmetic consideration. It is a chronic medical disease that can lead to diabetes, high blood pressure, heart disease, gallstones, and other chronic illnesses.
- Obesity is difficult to treat and has a high relapse rate. Greater than 95% of those who lose weight regain the weight within five years.
- Even though medications and diets can help, the treatment of obesity cannot be a short-term “fix” but has to be a life-long commitment to proper diet habits, increased physical activity, and regular exercise.
- The goal of treatment should be to achieve and maintain a “healthier weight,” not necessarily an ideal weight.

## Causes of Obesity

- Inactive lifestyle
- Stress
- Overeating
- Environment
- Genetic and family history
- Hormonal imbalance
- Medicines like corticosteroids, anti depressants or contraceptives
- Emotional factors
- Smoking
- Lack of sleep
- Lack of energy balance

## Parameters to Assess Obesity

Statistics of obesity as per the BMI (Table 1)

- Obese – 54%

- Overweight – 19%
- Normal – 27%

## Waist circumferences

Women with a waist measurement of more than 35 inches and men more than 40 inches may have higher chances of diseases than people with smaller waist measurements (Figure 1).

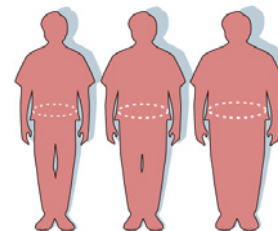
## Waist to hip ratio

Waist-hip ratio or waist-to-hip ratio (WHR) is the ratio of the circumference of the waist to that of the hips. Males with a waist to hip ratio of more than 1 while females of more than 0.85 are at a higher risk,

Almost 80% of the people had abdominal obesity or a waist circumference of over 90 cm.

## Skin folds thickness

This refers to the measurement of subcutaneous fat located directly beneath the skin by grasping a fold of skin and subcutaneous fat and measuring it using calipers. It is used mainly to determine relative



**Figure 1:** From left to right, the “healthy” man has a 33 inch (84 cm) waist, the “overweight” man a 45 inch (114 cm) waist, and the “obese” man a 60 inch (152 cm) waist.

	BMI (kg/m <sup>2</sup> )	Obesity Class
Underweight	< 18.5	
Normal weight	18.5 - 24.9	
Overweight	25.0 - 29.9	
Obesity	30.0 - 34.9	I
Obesity	35.0 - 39.9	II
Extreme Obesity	40.0 +	III

BMI=Weight in kg/ Height in m<sup>2</sup>.

**Table 1:** BMI - BMI equals a person's weight in kilograms divided by height in meters squared.

\*Corresponding author: Dr. Manjiri Patankar, Cosmetic Physician, Instasculpt, Head Office, Mumbai, India, E-mail: [manjiri.doctor@gmail.com](mailto:manjiri.doctor@gmail.com)

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fatness and the percentage of body fat (Table 2).

### WHO Classification as per BMI

The World Health Organization uses a classification system using the BMI to define overweight and obesity.

- A BMI of 25 to 29.9 is defined as a “**Pre-obese.**”
- A BMI of 30 to 34.99 is defined as “**Obese class I.**”
- A BMI of 35 to 39.99 is defined as “**Obese class II.**”
- A BMI of or greater than 40.00 is defined as “**Obese class III.**”

### Why do people become obese?

People become obese for several reasons, including:

- Consuming too many calories.
- Leading a sedentary lifestyle.
- Not sleeping enough.
- Endocrine disruptors, such as some foods that interfere with lipid metabolism.
- Lower rates of smoking (smoking suppresses appetite).
- Medications that make patients put on weight.

### What are the health risks associated with obesity?

- Type 2 (adult-onset) diabetes
- High blood pressure (hypertension)
- High cholesterol (hypercholesterolemia)
- Stroke (cerebrovascular accident or CVA)
- Heart attack
- Congestive heart failure
- Cancer
- Gallstones
- Gout and gouty arthritis
- Osteoarthritis (degenerative arthritis) of the knees, hips, and the lower back
- Sleep apnea

### Obesity Management

The indicated treatment is a combination of fat loss with weight loss, which is best adapted by nutritious diet, lifestyle modifications and increased physical activity.

#### Caloric restriction

Caloric restriction (CR), or calorie restriction, is a dietary regimen that restricts calorie intake, where the baseline for the restriction varies, usually being the previous or unrestricted intake of the subjects.

#### Behavior modification

- Dietary intervention
  - o Healthful eating in accordance with the dietary guidelines

- o A lowered fat consumption
- o An increase in fruit, vegetable, and whole grain consumption
- Physical activity
  - o Increased frequency
  - o At least moderate intensity
  - o Increased caloric consumption
  - o Increased basal metabolic rate

With the above benefits physical activity like aerobics with Weight training is recommended.

### Pharmacotherapy

Prescriptions of certain drugs which are safe with no side effects have following benefits

- Inducing fat loss with resultant weight loss
- Inhibiting absorption of dietary fat
- Flushing out the excess fat cells
- Opening up of lymphatic blockages if any

### What is the difference between weight loss and fat loss?

Weight loss refers to losing kilos on the scale either from muscle, fat or water, while fat loss, isn't much about the scale but about getting rid of body fat, losing inches in all the right places and looking slimmer. Fat loss reduces total body fat percentage there by reducing risks of obesity

### Role of non surgical treatments in obesity

Inspite of reduction in weight the fat mass or fat % would not be reduced as per individual desire and there can be specific bulges in various body parts.

Increased waist circumference is directly proportional to increased cardio-metabolic risks than increased BMI,

Because of Cosmetic reasons people will have a perfectly sculpted body and figure.

### Indications for fat loss treatments

Fat loss treatments are useful for those who

- Have tried all means of weight loss
- Have lost weight but now not losing anymore
- Have stubborn areas of fat or cellulite in otherwise non-obese individuals
- Are unable to diet or exercise and their extra weight is posing a danger to their health
- Wants a perfect figure or physique

### How does one tackle with fat which does not go with diet and exercise?

The fat deposited in a specific area which doesn't go off with diet and exercise can be treated with various, advanced, nonsurgical and safe technologies.

## Precise Body Contouring Is Done With

**Ultrasonic lipolysis** - Latest french technology of high Intensity focalised Ultrasound waves for Instant Permanent Fat Loss

**Endermology**- Deep lymphatic massage drainage, lipomobilisation and resistant fat clearance

**Radiofrequency with Diode laser** - US FDA approved treatment for sagging skin

**Mesotherapy** - Non invasive electrophoretic lipolysis for Cellulite from Spain

7.1 **Ultrasonic lipolysis with HIFU**: An instant, permanent, non-surgical fat loss technique wherein one loses approximately 1-3 inches in areas like abdomen, waist, hips, thighs and arms in an hour.

High Intensity Focalised Ultrasound (HIFU) waves are focused up to 1.5 cm below the skin and permanently destroy unwanted fat cells (Figure 2).

It consists of-

- HIFU : High Intensity Focalized Ultrasounds
- One manual transducer to deliver therapeutic ultrasonic waves on determined areas at specific depth
- UMD : Multi drainage ultrasounds
- 18 UMD transducers to perform a lymphatic drainage
- All under computer software monitored and visualized on TFT video screen in real time

### Histological picture:

What is a HIFU technology action?

- First de-polymerisation or molecular dissociation of the triglyceride and increase in the fluidity.
- Second Lipolysis or ejection of fatty acids from adipocytes is made via the stable cavitation phenomena and by the increase of the permeability of the adipocyte.
- Third Defibrosis by the mechanical action of the connective tissue in the hypodermis (Figure 3).

### What is a UMD technology action?

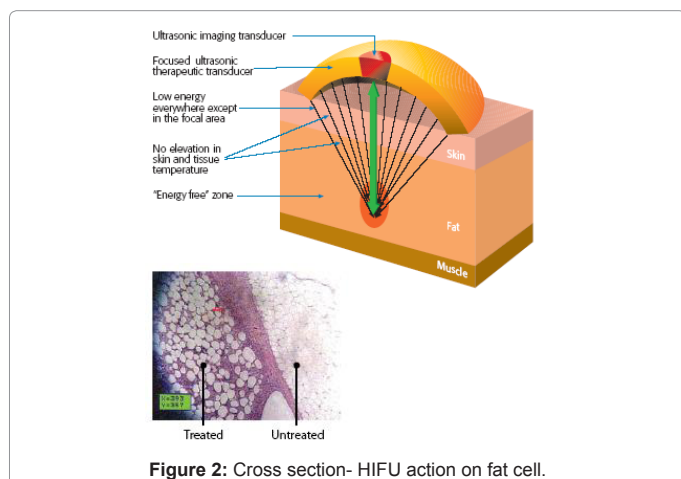


Figure 2: Cross section- HIFU action on fat cell.

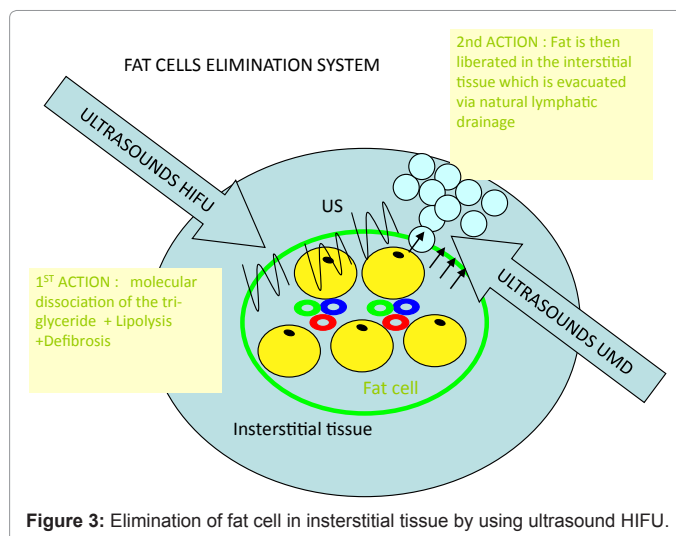


Figure 3: Elimination of fat cell in interstitial tissue by using ultrasound HIFU.

UMD is used to evacuate the liberated fat from the interstitial tissue via natural drainage through lymphatics. Immediate drainage, mainly lymphatic, is a priority as in every kind of lipolysis technique, since it will mobilise the fat liberated by the ultrasound stable cavitation.

**Endermologie**: US FDA approved technology that included reduction of cellulite, reduced body measurements, increased circulation, relief of muscular pain, and reduction of muscle spasms. It was developed in the 1980's as a non-surgical method to treat the scars of burn victims, who began to notice improvements in their cellulite as well. From that point forward the many benefits of endermologie began to be recognized.

It has 2 rollers and a gentle suction action when rolled over the top layer of fat makes a fold. This folding action stretches the connective tissue and results in the reduction of cellulite and body measurements. It is an effective detoxifying drainage for revitalization and oxygenation of tissue. It reduces bloating of water retention and dissolves fat by lipo-mobilization. It gives dramatic effects in reshaping and contouring difficult areas of the body.

**Does endermologie reduce cellulite?** : Yes, Endermologie has been extensively studied and received approval by the FDA to specifically make the claim that it does reduce cellulite (Figure 4).

**What is cellulite or resistant fat?** : Cellulite is simply a term that describes the appearance of bumpy looking fat on the body. It is not an actual disease, but it is a condition of bulging fat cells and other coexisting factors that result in the appearance of cellulite. Sometimes the fat cells expand so much that they cause the collagen fibers around them to bend causing puckering of the skin above. There are three layers of fat found in the body. Cellulite is located in the layer of fat closest to the skin.

Sometimes the fat cells squeeze on the connective tissues (collagen fibers) and there is little room for the lymphatic drainage system to relieve this build-up of fluids, fats, and toxins. Fat in this layer does not respond well to diet or exercise.

**How cellulite forms**: There has been many scientific studies to shed light on how cellulite forms. Based on the research, it is thought that cellulite begins when an accumulation of swollen fat cells develops. The swollen fat cells press on the connective fibers that surround them.

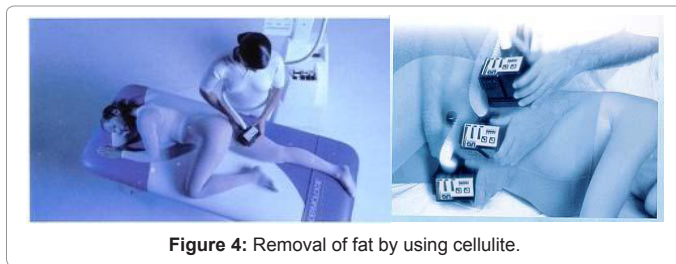


Figure 4: Removal of fat by using cellulite.

Then connective fibers bend and pull the skin downward to which they are connected. The result of these conditions is a puckered look on the surface of the skin, which we call the “dreaded” cellulite.

However, diet and exercise can not eliminate cellulite.

### Mesotherapy

It’s a safe, effective & Non-surgical therapy for fat-loss, cellulite, meso/face-lift (face & neck rejuvenation). Mesotherapy promotes the body’s circulatory, lymphatic and immune system to create a biological response and reverse abnormal physiology. It is virtually painless, requires no post-operative recovery time/ heavy bandages/ anesthesia. The customized mixture of vitamins, amino acids & medications are delivered in the mesoderm by electrophoresis.

**Fat Loss:** It’s a latest breakthrough for cellulite reduction. It targets specific areas or spots where the body stores excessive fat.

**Cellulite:** Cellulite affects the majority of women over the age of twenty. It is caused by poor circulation, fat herniation, a weakening of connective tissues, lymphatic congestion and hormonal imbalances. Cellulite is classified into four stages, based upon its appearance while standing, laying and pinching the skin, causing a dimpling and cottage cheese appearance of the skin. cellulite is not a disease related to excess weight.

**Mesolift:** Aging, sagging and wrinkling of the skin occurs from the accumulation of fat, loss of skin elasticity and excessive free radical damage. Using antioxidants and amino acids, mesotherapy can remove fat from the thighs and hips. Mesotherapy for skin is a non-surgical contouring, also helps in skin rejuvenation

Mesotherapy helps to

- Improve blood flow
- Dissolve excess fat deposit
- Removes fibrotic hardened connective tissues
- Smoothens skin
- Gradual loss of inches
- Oedemic cellulite improvement
- Lipodistrophy
- Irregularities correction
- Skin elasticity enhancement

### Radio frequency with diode laser

US FDA approved technology of radio frequency with laser which can make your face look younger, beautiful, rejuvenated (Figure 5).

A New anti aging treatment for skin health is affected by interaction

of external & internal factors like aging, stress, sunlight, hormones, giving rise to acne, open pores, hyper pigmentation, dark circles, wrinkles, sagging face, double chin and puffy face. Instead of doing multiple procedures like botox, chemical peels, surgical face lift, fat transfer, fillers, we can correct skin function & restore skin health by

- Bipolar Radio Frequency with Diode Laser which is a clinically proven, US-FDA approved treatment.
- It heats deep collagen fibers in the skin & thereby regenerates collagen.

It renews facial contouring and reduces double chin, smoothen wrinkles, improves complexion and gives a young glowing skin.

- Disappearance of fine lines

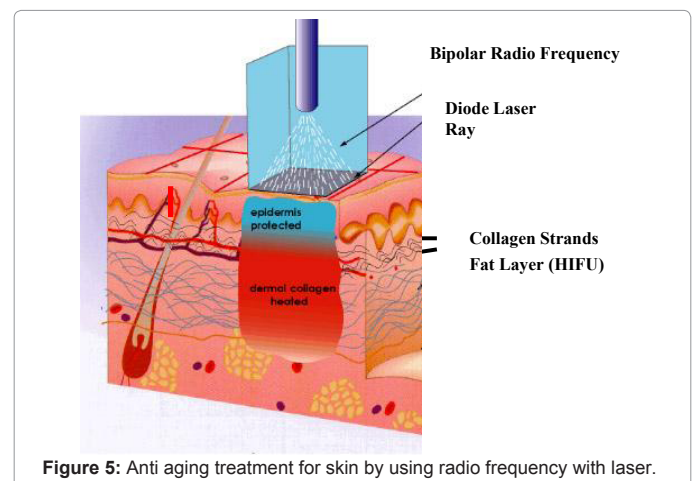


Figure 5: Anti aging treatment for skin by using radio frequency with laser.

Disease Risk* Relative to Normal Weight and Waist Circumference				
	BMI (kg/m <sup>2</sup> )	Obesity Class	Men 102cm (40 in) or less Women 88cm (35 in) or less	Men > 102cm (40 in) Women > 88cm (35 in)
Underweight	< 18.5			
Normal weight	18.5 - 24.9			
Overweight	25.0 - 29.9		Increased	High
Obesity	30.0 - 34.9	I	High	Very High
Obesity	35.0 - 39.9	II	Very High	Very High
Extreme Obesity	40.0 +	III	Extremely High	Extremely High

Table 2: \* Disease risk for type 2 diabetes, hypertension, and CVD.

NATIONALITY	AVERAGE LOSS in Cm at waist line per session	AVERAGE Reduction in total body fat percentage
ARABIC	1.50	1.00%
AMERICAN	2.80	1.25%
CANADIAN	2.00	0.80%
EGYPTIAN	2.00	1.50%
FRENCH	2.30	1.00%
INDIAN	2.00	0.80%
ITALIAN	1.90	1.00%
LEBANESE	2.00	0.90%
PAKISTANI	2.80	2.00%
SYRIAN	2.00	1.60%
SPANISH	1.30	1.10
TUNICIAN	1.75	0.35

Table 3: Average loss & reduction in national wise.

- Diminishes wrinkles
- Improvement of cutaneous hydration & structure
- Improvement of skin appearance and quality
- Greater collagen production

**Indications:**

- Skin toning
- Skin tightening
- Firming
- Body contouring

**Clinical study of non- surgical treatment in reduction of waist circumference and resistant fat:** Randomized controlled, multicenter,

multiracial study comparing effects of lipolysis with lymphatic drainage of fat, on fat percentage and waist circumference was carried out in men and women with BMI 28 to 30.

**Result**

It was observed that average reduction in the waist circumference after one session of lipolysis was 2.029 cm and reduction in total body fat percentages by 1.1375 (Table 3).

**Conclusion**

Combination of non invasive fat loss treatment of High Focalized Intensity Ultrasound (HIFU), endermology, Mesotherapy and laser resulted in reduction of resistant fat which does not go with current treatment modalities of diet, exercise and pharmacotherapy and also reduces percentage of body fat.