

**Effectiveness of a cutting-edge technology  
beauty-treatment machine in sculpting the body:  
a clinical study**

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*(SHORT VERSION)*

## Introduction

There are various problems associated with beauty treatment and these involve numerous different aspects: the different marks of so-called cellulite, excess weight, loss of skin and muscle tone, localised fat cushions, circulation stasis and liquid retention. In all these cases the main desire is to re-sculpt the shape of the body according to specific requirements or models, reducing the circumference by a few centimetres, upgrading skin tension and muscle mass, eliminating excess fat and cellulite.

Very often, these requirements do not involve the body as a whole, but are focussed on specific parts, above all the hips, the abdomen, the glutei and the thighs.

The treatment of body problems of this type must exploit different and synergic approaches. A correct eating strategy must therefore be devised, with appropriate physical exercise and targeted medical, surgical and beauty treatment intervention.

Beauty treatments should envisage a broad range of choices to enable the operator to adapt his/her instruments to the complexity of the specific case. Draining methods must be used for venous and lymphatic circulation, lipolytic methods for excess fat, stimulating treatments in case of loss of muscle tone and everything that can improve trophism, oxygenation and the nourishment of the skin and subcutaneous area.

In this study, we have tried to assess the effectiveness of a complex apparatus that associates infra-red, ultra-sound and electro-stimulation on a group of people with silhouette anomalies caused by cellulite, fat and the loss of muscle and skin tone.


## Materials and methods

The study was performed on 12 voluntary patients, all female and aged between 23 and 41.

The patients were selected on the basis of the presence of a change in correct body silhouette due to the presence in the abdominal-glutei-thigh area of one or more of the following aesthetic situations:

- Cellulite in any stage and with any characteristics (recent, soft, lympho-dermic, with adipose, etc.)
- Excess fat, localised or extensive
- Loss of skin tone and elasticity

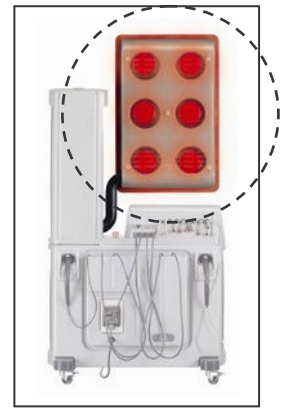
For experimentation, the **SLIM UP<sup>®</sup> ULTRA** appliance was used

made by  SAUNA ITALIA S.p.A.  
Via del Lavoro, 6 - Zona Industriale  
Montaletto  
48015 CERVIA (RA) -ITALIA

This system consists of a part able to operate with infra-red rays, electro-stimulating current and ultra-sounds.



**The infra-red section** achieves deep heating with 6 x 100 W lamps with emission spectrum selected for the most penetrating wavelengths. The lamps are housed on a moving arm; the temperature of the skin surface is controlled by an electronic sensor that reduces emission intensity at the threshold of 43°. The distance of the arm from the body is standardised according to the height of the couch and the angle of incidence of the irradiation is such as to cover the body surface uniformly. The increase in in-depth temperature would justify the raising of the adipose tissue metabolism according to the known law of 14% increase for each degree of temperature besides this, the infra-red rays can increase oxygenation, blood flow, lymphatic return, cell regeneration and the penetration of cosmetic products.



**The electro-stimulating section** is distributed on 8 channels that can be individually adjusted in terms of intensity and exploits a bi-directional compensated square wave current at low frequencies (2-80 Hz). The 16 electrodes, adhesive and heat-resistant, can be applied all over the body and stimulate the large deep muscles in order to firm and sculpt shapes, but also the thin surface and subcutaneous muscles, so as to also recover the loss of skin tone. A face handpiece integrates electro-stimulation with a high-intensity white light featuring latest-generation LEDs.



**The ultra-sounds** are emitted by 20 sources distributed on 2, 4 and 6-emitter plates. The vibrational energy emitted raises local temperature, along with the previously seen action of the infra-reds. In the deep tissues, rich in liquids, ultrasonic cavitation is also developed, an implosion of newly-formed micro-bubbles, such as to promote a permeabilisation of the adipose membranes with lipolytic effect and a fibrolysis on the often hypertrophic connective branches. The ultra-sounds are also distributed with a single handpiece for localised areas and the vehiculation of active principles.



Slim UP<sup>®</sup> ULTRA contains 7 different treatment programs of the multiphase type, with reasoned mix of the different energy sources, times, frequencies, duration of variable impulse.

In this study, two work programs have been used, Slim for those persons with prevalent abdomen-hip problems and Megaslim for prevalent glutei-thigh problems. Each session ended with pressotherapy treatment using the *Slim UP<sup>®</sup> DRAIN appliance made by SAUNA ITALIA<sup>®</sup>*, so as to favour detoxication, liquid drainage and the mobilisation of the products of the metabolism of the adipose tissue.

**In order to restrict external effects to the utmost, the volunteers were asked to maintain their normal lifestyle and in particular not to start slimming diets, beauty treatments or beauty therapies and cycles of sports activity or physical activity in general during the study period.**

All the selected individuals completed experimentation. Each individual performed **12 sessions** during the period of time between 6 October and 26 November 2007.

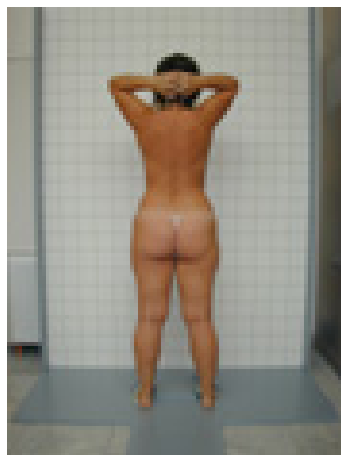
The assessment of the response to treatment was based on the following instrumental parameters:

1) Measuring of weight in kg and measuring of circumference in cm at repeatable heights. These figures were recorded at the start of each single session; final measurement was made a week after the last session. A standardised method was used exploiting the *Slim UP<sup>®</sup> STATION appliance made by SAUNA ITALIA<sup>®</sup>*. This instrument uses a self-tensor circumference measuring belt with automatic recording of measurement height off ground, so as to make all the subsequent readings repeatable and objective. Besides weight, account was also taken of the measurements in centimetres around the waist, the tummy, the hips and the right thigh.

2) Analysis of the different body compartments obtained with a BIA 101 multi-frequency bio-impedance meter *made by the company Akern of Florence, Italy*, determined at the start of the treatment cycle and one week after its end. This analysis method exploits the bioelectrical resistance and reactive measurements, reading the changes in tissue hydration. The relations between the various body compartments are constant and interdependent, thereby enabling the operator to evaluate the various compartments in terms of quality. In the specific case, the values were followed relating to the fatty mass and muscle mass, so as to determine any percentage movements in body composition.

3) Ultrasound scan of the soft tissue using *Esaote Biomedica Firenze, Italia* appliance and 7.5 Mhz probe on the repeatable thigh reference points (3 cm to the rear of the head of the thigh bone) and hip reference points, determined at the start of the treatment cycle and one week after the end of the cycle. Ultrasound scanning is currently the best way to directly evaluate the conditions of the tissues with reference to the thickness of the fat, to the quantity of deep liquid in stasis, to the density of the fibres and connective branches.

4) Photographic documentation in the 3 front projections, dorsal and left lateral, at the start and one week after the end of the treatment cycle, using Nikon Coolpix digital camera in mandatory flash position. To obtain the maximum reproducibility and standardisation of the test, a photographic station was used consisting of a squared background with 10 x 10 cm meshes, mandatory positioning of feet in depth and width by means of templates fastened to the floor, camera located at mandatory height on a tower at a predetermined distance tied to the backdrop with rigid platform.



*Example of photographic survey with fixed distance between backdrop and camera  
Notice the mandatory feet positions*

## Results

### Measurements

The results were very interesting.

Despite the absence of any dietary restriction, an average reduction of 2.2 kg was achieved, probably the result of the infra-red and ultrasonic lipolytic effect on the fatty masses.

PERSON	WEIGHT KG.	
	Before	After
D.B.	58,1	56,3
S.F.	67,9	66,5
C.G.	64,9	60,5
M.M.	72,3	69,9
L.M.	75,8	75,1
C.Z.	65,8	62,3
N.L.	63,2	60,1
A.T.	64,1	61,6
R.Z.	80,2	77,8
L.N.	58,3	57,0
S.O.	57,7	56,8
S.Z.	56,1	54,0
	784,4	757,9
Average reduction		<b>Kg. 2,20</b>

*Weight comparison chart before and after treatment*

The data relating to the measurements taken in the four study points must be underlined: the average reduction of the total of the four parameters amounts to 22.04 cm, with a reduction of 4.6 cm at the waistline, 6.9 cm at the tummy, 6.5 cm at the hips and 4.3 cm at the thigh.

These data are even more significant when studied case by case, because the average of the four points or the average on the twelve patients tends to level out the best results for each single individual; we have in fact found the following best reduction results: at the waistline 8.4 cm, at the tummy 10.2 cm, at the hips 9.8 cm, at the thigh 6.1 cm.

PERSONS	MEASUREMENTS (CM)	Before	After	Difference
D.B. 41 years old, shopkeeper h. 158.5 cm	waistline	70,0	65,8	<b>4,2</b>
	tummy	83,5	76,6	<b>6,9</b>
	hips	98,0	93,0	<b>5,0</b>
	right thigh	60,3	56,3	<b>4,0</b>
S.F. 36 years old, architect h. 160 cm	waistline	75,8	71,0	<b>4,8</b>
	tummy	90,2	84,0	<b>6,2</b>
	hips	106,6	102,0	<b>4,6</b>
	right thigh	60,8	60,0	<b>0,8</b>
C.G. 33 years old, gym instructor h. 155 cm	waistline	73,8	68,0	<b>5,8</b>
	tummy	97,2	87,0	<b>10,2</b>
	hips	105,6	96,8	<b>8,8</b>
	right thigh	61,2	56,8	<b>4,4</b>
M.M. 29 years old, clerk h. 172 cm	waistline	74,6	70,4	<b>4,2</b>
	tummy	97,4	90,6	<b>6,8</b>
	hips	105,8	101,0	<b>4,8</b>
	right thigh	61,2	56,4	<b>4,8</b>

L.M. 20 years old, student h. 161.5 cm	waistline	74,8	71,8	<b>3,0</b>
	tummy	91,0	84,2	<b>6,8</b>
	hips	112,0	102,8	<b>9,2</b>
	right thigh	66,0	61,8	<b>4,2</b>
C.Z. 33 years old, clerk h. 158 cm	waistline	72,8	64,4	<b>8,4</b>
	tummy	88,6	79,0	<b>9,6</b>
	hips	98,8	89,0	<b>9,8</b>
	right thigh	61,4	56,2	<b>5,2</b>
N.L. 36 years old, housewife h. 158 cm	waistline	79,2	73,4	<b>5,8</b>
	tummy	88,8	82,2	<b>6,6</b>
	hips	97,2	91,2	<b>6,0</b>
	right thigh	56,0	51,8	<b>4,2</b>
A.T. 23 years old, cashier h. 159.5 cm	waistline	72,6	66,4	<b>6,2</b>
	tummy	90,0	80,6	<b>9,4</b>
	hips	101,0	93,2	<b>7,8</b>
	right thigh	63,3	57,2	<b>6,1</b>
R.Z. 27 years old, clerk h. 169 cm	waistline	80,3	75,8	<b>4,5</b>
	tummy	103,6	97,4	<b>6,2</b>
	hips	107,3	103,0	<b>4,3</b>
	right thigh	66,0	62,2	<b>3,8</b>
L.N. 29 years old, bank clerk h. 158.5 cm	waistline	67,8	66,0	<b>1,8</b>
	tummy	82,8	77,5	<b>5,3</b>
	hips	96,6	92,4	<b>4,2</b>
	right thigh	57,2	53,6	<b>3,6</b>
S.O. 25 years old, worker h. 159 cm	waistline	64,2	60,8	<b>3,4</b>
	tummy	83,8	79,4	<b>4,4</b>
	hips	103,2	94,6	<b>8,6</b>
	right thigh	60,2	55,2	<b>5,0</b>
S.Z. 31 years old, lawyer h. 157.5 cm	waistline	69,2	68,3	<b>0,9</b>
	tummy	82,2	78,0	<b>4,2</b>
	hips	94,5	90,0	<b>4,5</b>
	right thigh	57,0	51,8	<b>5,2</b>

Average reduction of total of four parameters	<b>22,04</b>
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	<b>Average reduction (cm)</b>	<b>Best result (cm)</b>
<b>WAISTLINE</b>	4,6	<b>8,4</b>
<b>TUMMY</b>	6,9	<b>10,2</b>
<b>HIPS</b>	6,5	<b>9,8</b>
<b>THIGH</b>	4,3	<b>6,1</b>

*Measurement comparison charts before and after treatment*

BEFORE



AFTER



Considerable reduction of thighs with increase of space between these. Improvement of waistline and tummy.



Considerable reduction of waistline, hips, trochanteric cushions. Increase of space between thighs. Improvement in appearance of cellulite.



Excellent reduction of waistline and tummy.

A.T. – years old - cashier – h. 159,5 cm  
representative subject



### **Impedance meter analysis**

Impedance meter readings are also extremely interesting, especially considering the absence of a contemporary diet and back-up physical exercise. Replacing fatty mass with muscle mass does in fact normally involve increase in movement and correct diet. The treatment was able to considerably improve mass distribution, with a 1.2 average reduction in the percentage of fatty mass and a contemporary 0.95 average increase in the percentage of muscle mass. This means fat was positively replaced by muscle tissue, even without an increase in physical activity and an appropriate diet.

PERSON	% FATTY MASS	
	Before	After
D.B.	32,1	33,2
S.F.	36,9	35,3
C.G.	35,2	34,0
M.M.	37,3	35,5
L.M.	42,4	41,0
C.Z.	37,1	35,1
N.L.	37,2	34,5
A.T.	35,2	33,4
R.Z.	43,3	42,8
L.N.	33,2	32,1
S.O.	33,5	33,5
S.Z.	33,8	32,1
	437,2	422,5
Average reduction		<b>1,2</b>

PERSON	% LEAN MASSA	
	Before	After
D.B.	37,6	38,5
S.F.	35,9	36,9
C.G.	37,5	39,1
M.M.	37,0	37,9
L.M.	33,7	34,3
C.Z.	35,7	37,6
N.L.	37,3	38,9
A.T.	37,5	38,9
R.Z.	32,1	32,5
L.N.	39,9	39,6
S.O.	21,6	21,8
S.Z.	39,0	40,3
	424,8	436,3
Average increase		<b>0,95</b>

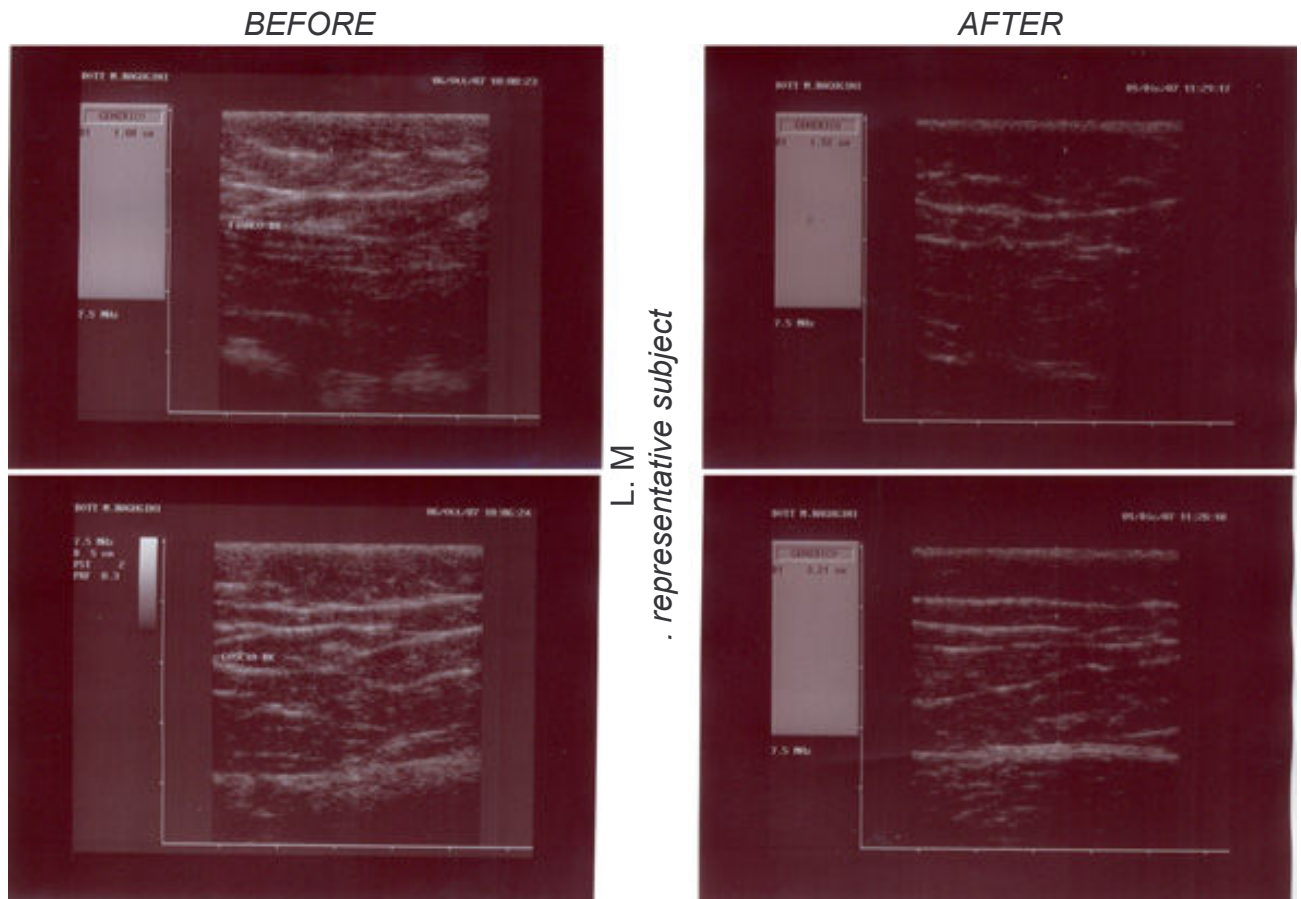
*Fatty mass and lean mass comparison charts, before and after treatment*

### **Soft tissue ultrasound scan**

The treatment affected all the subcutaneous layers. The average reduction by ultrasound section at thighs was 0.4 cm. The images showed a good response of the fibrous structures with a reduction in the thickness of the hyperecogen layers in most patients. There was also a strong improvement in the aqueous component of the deep layers. This re-sculpting in the sense of a greater tissue physiology leads us to presume there will be a goods response in the future as well.

*Comparison chart of patients with ultrasound measuring at level of thighs and hips  
(A = measurement taken at abdomen level)*

PERSONS	thighs before	thighs after	difference	hips before	hips after	difference
R.Z.	3.57	3.25	<b>0.32</b>	2.40	1.50	<b>0.90</b>
M.M.	3.69	2.94	<b>0.75</b>	2.20 A	1.80 A	<b>0.40 A</b>
L.M.	3.72	3.21	<b>0.51</b>	1.88	1.52	<b>0.36</b>
N.L.	2.98	2.46	<b>0.52</b>	2.03 A	1.69 A	<b>0.34 A</b>
A.T.	3.91	3.68	<b>0.23</b>	1.59 A	1.25 A	<b>0.34 A</b>
C.G.	3.31	2.80	<b>0.51</b>	1.08	0.98	<b>0.10</b>
L.N.	3.00	2.99	<b>0,01</b>	1.30 A	1.26 A	<b>0.04 A</b>



Excellent reduction on all layers with ultrasound slimming appearance of hyperechoic strips (fibrous structures).

Comparison chart of patients with ultrasound measuring at thigh level

PERSONS	thighs before	thighs after	difference
S.O.	3.69	2.84	<b>0.83</b>
S.Z.	3.19	2.81	<b>0.38</b>
D.B.	4.18	3.87	<b>0.31</b>
S.F.	3.10	2.86	<b>0.24</b>
C.Z.	2.95	2.73	<b>0.22</b>

## Remarks

*Treatment with the Slim Up Ultra appliance, performed over 12 sessions without contemporaneous diet and increase in physical exercise, showed itself to be considerably effective.*

*The following results were achieved:*

- excellent reduction in circumference centimetres (waist, hips, glutei, thighs)*
- shift of fatty mass to muscle mass, in accordance with a good reduction in body weight*
- a much improved appearance of silhouette, documented by photos.*

*The ultrasound scan of the soft tissues further confirmed rearrangement of deep tissue relating to the aqueous, adipose and fibrous component, with expectation of further improvement of the external parameters in the immediate future.*

*To the expected lipolytic action of the ultrasounds and infra-red rays has certainly been added a strong firming component, due to the electro-stimulation, which has affected centimetres and silhouette, probable consequence of the considerable rearrangement of the deep tissue in a more physiological sense indicated by the ultrasound scan.*

**Dott. Andrea Paolorosso**

