

Wellness

Institute for Health, Exercise & Nutrition GmbH

*Study on the Efficiency and
Effectiveness of Electronic
Muscle Stimulation (E.M.S.)
Treatments on Weight,
Fat, and Inch Reduction
with the help of the
ULTRATONE PRO 20*

Directed by
The Wellness Education Institute for
Health, Exercise, and Nutrition GmbH,
Münster, October 1995

Management
Prof. Dr. U. Becker, Dipl. Nutritional Science,
M. Janotta,
Dr. J. Möhlmann, Exercise Therapist
M. Brand

STUDY

On the Efficiency and Effectiveness of Electronic Muscle Stimulation (E.M.S.) Treatments on Weight, Fat, and Inch Reduction with the help of the ULTRATONE PRO 20

Test-Phase I

directed by

**The Wellness Education Institute for Health, Exercise, and Nutrition
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2 Scope of Application for Electronic Muscle Stimulation¹

Electronic Muscle Stimulation (E.M.S.) with the ULTRATONE 20 unit comes under the area of treatment with a cosmetic apparatus. Its use can be found in cosmetic and increasingly in fitness salons, particularly for the treatment of figure problems:

Cosmetic and fitness salons

- Fat reduction (inch loss) in the so-called problem areas of the body, especially the waist, hips and upper thighs
- Muscle building and tightening of the tissues
- Cellulite treatment
- Slimming therapy

Indications

This study is concerned primarily with fat reduction (inch loss) in the problem areas, and weight reduction, as well as, among others, the development of the musculature, though muscle building is not for the time being the primary focus.

Fat reduction and weight loss

The test was conducted with 44 subjects. The test period was fixed, for practical and other reasons, at 60 days. Within this period, all the subjects were given 15 electronic stimulation treatments of 45-50 minutes' duration with the ULTRATONE 20. The programme was exclusively the ULTRATONE 20 Programme 2, selected with an intensity that was still considered comfortable by the subjects (5-8).

The subjects were divided into two groups:

Group 1: Subjects who took part without any sport or nutrition programme.

Group 1

Group 2: Subjects involved in a Wellness-Institute programme directed at exercise and nutrition

Group 2

Before each initial treatment, a detailed interview had to be conducted with each participant, in order to determine their suitability, i.e. it had to be determined whether there were any contra-indications.

These included:

- A heart pace-maker
- Metal in the body (implants, coil)
- Circulatory disturbances, thrombosis
- Inflammatory disease (nerve or skin disease)
- Pregnancy

Contra-indications

¹ The use of E.M.S. in medicine, for example in the area of rehabilitation, is not considered here.

3 The Test Design

3.1 The Test Time Period

The period of the study was limited for several reasons to 60 days.

1. It was important to guarantee that all the subjects included in the study could take part in the E.M.S. treatment at the most regular intervals possible.
2. It was also important to choose a time period that would be of an acceptable duration for the participants. With a longer time period, it can be observed that, for common reasons, a greater drop-out rate is experienced. In fact, the drop-out rate among subjects during the period of the study was 0%.

Test period for
phase 1: 60
days

0% drop-out
rate

Over 90% of the participants were keen to continue with ULTRATONE E.M.S. therapy after the treatments!

3.2 Test Groups

Subjects: Total 44	Age	Height (cm)	Initial weight (kg)	final weight (kg)	Weight loss (kg)
Average	33.1	166.3	75.0	70.2	4.9
Max.	73.0	180.0	116.0	106.0	18.0*
Min.	21.0	153.0	52.0	53.0	-1.0

Combined
group

The test group consisted of 44 subjects with an average age of 33.1. The oldest participant was 73, the youngest was 21 years old. The median height was 166.3 cm; the average initial weight came to 75.0 kg. The heaviest participant weighed 116 kg, the lightest had an initial weight of 52 kg. The average weight loss for all the participants was 4.9 kg. The highest weight loss amounted to 18 kg.

In the group of subjects who did not take part in any exercise or nutrition programme, and who had E.M.S. treatment only, the following results could be seen:

Subjects: 21	Age	Height (cms)	Initial weight (kg)	final weight (kg)	Weight loss (kg)
Average	31.38	165.95	74.14	70.74	3.40
Max.	73	179	116	106	10
Min.	21	158	52	53	-1

Subjects with
E.M.S. only
(Group 1)

*NB: The figures in each row do not refer to the same individual, but represent the extreme values found in the group as a whole.

Test group 1 consisted of 21 subjects with an average age of 31.38. The oldest participant was 73, the youngest was 21 years old. The median height was 165.95 cm; the average initial weight came to 74.14 kg. The heaviest participant weighed 116 kg, the lightest had an initial weight of 52 kg. The average weight loss for all the participants was 3.4 kg. The highest weight loss amounted to 10 kg.

The group of participants who took part in the special exercise and nutrition programme showed the following values:

Subjects: 23	Age	Height (cms)	Initial weight (kg)	final weight (kg)	Weight loss (kg)
Average	34.7	166.6	75.9	69.7	6.2
Max.	56.0	180.0	96.0	88.0	18.0*
Min.	23.0	153.0	61.0	54.0	1.0*

**Subjects with
nutrition and
exercise
(Group 2)**

Test group 2 consisted of 23 subjects with an average age of 34.7. The oldest participant was 56, the youngest was 23 years old. The median height was 166.6 cm; the average initial weight came to 75.9 kg. The heaviest participant weighed 96.0 kg, the lightest had an initial weight of 61 kg. The average weight loss for all the participants was 6.2 kg. The highest weight loss came to 18 kg. To enhance muscle development, the participants were provided with a supplement of protein.

**Protein for
muscle
enhancement**

4 Treatment Outcome

Two measuring methods were employed: the BIA measure and the circumference measure.

4.1 The BIA Measure

This entails a computerised determination of the body composition into fat, muscle and water. This was conducted at the beginning and the end of the therapeutic applications, in order to be able to compare the actual condition of the subjects before and after the treatment.

Bioelectrical Impedance Analysis (B.I.A.) is a measure of resistance in the body. It is a non-invasive method. Four surface electrodes are placed on specifically designated body areas of the subjects. A weak high-frequency alternating current is passed through the body. The component resistance to conductivity is measured. The subject's body composition with regard to fat, muscle and water components is measured through the ohm and capacitive resistances.

**Measurement
of body
composition**

The impedance analysis records the three main constituents of the body: water, lean tissue and fat. Changes in the subjects' body constituents during the test period could be followed continuously.

We decided on this method because its accuracy and reliability have been shown in countless scientific studies.

4.2 The Circumference Measure

The circumference measure also took place at the beginning and the end of the investigation period.²

Specially selected positions in the problem areas were marked (measured vertically from the floor), and recorded. Subsequently, the circumferences at the respective vertical positions were measured with the use of a special tape measure.

The tape measure has an automatic spooling adjustment, which allows relatively precise measuring to be carried out, and keeps the margin of error to a minimum. In this way, any possible manipulation of the measuring process was virtually eliminated.

The measurement results are therefore clearly more precise than with a traditional type of tape measure.

²Measurements were of course taken after each treatment; however, for pragmatic reasons these and others were not used in the data.

5 Test Results

Although muscle tone was not a priority consideration in the present study, here too on average some quite satisfactory results were obtained, even though a special muscle toning programme on the ULTRATONE 20 was not utilised. The results for weight and fat reduction overall as well as in the problem areas are presented in detail for the respective test groups in the APPENDIX.

In an interview following the test results, 98% of the participants were very satisfied, and were available to undergo further investigating.

In the currently running test phase, the emphasis is on arriving at evidence of the efficiency, that is to say also the degree of effectiveness, of the ULTRATONE 20 in muscle toning, without any further muscle-enhancing measures being brought in.

6 Summary and Conclusion

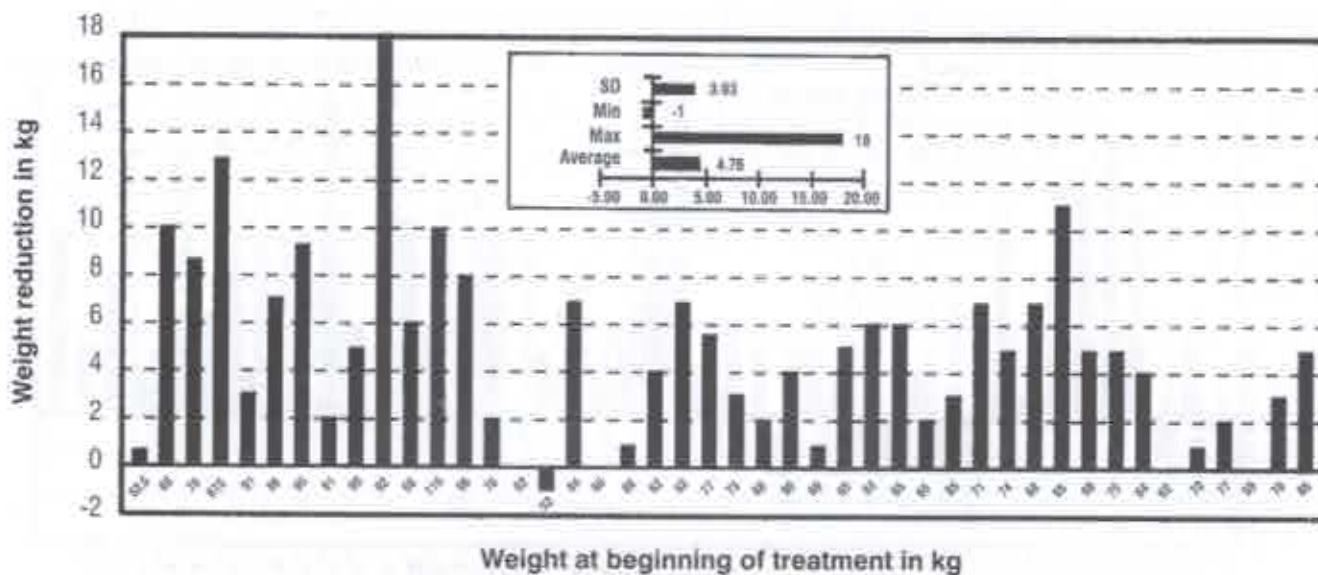
Basic guidance for the efficient application of the ULTRATONE 20 is necessary, since as can be seen in the test and investigation phases, the effectiveness of the electronic stimulation (E.M.S.) treatment improves with increasing experience at placing the surface electrodes (pads). Knowledge of functional anatomy and muscle physiology ought to be considered as part of this guidance.

It has been established conclusively that very good results were shown in E.M.S. treatments, in particular for weight and inch loss, in both groups, especially in consideration of the relatively short test period as well as the limited number of treatments. It is evident nevertheless that in group 2, with additional exercise and nutritional support, even better results were able to be obtained.

Study of Electronic Muscle Stimulation
 Test group: 45 women with figure/weight problems
 Test period: 60 days
 Test unit: ULTRATONE 20

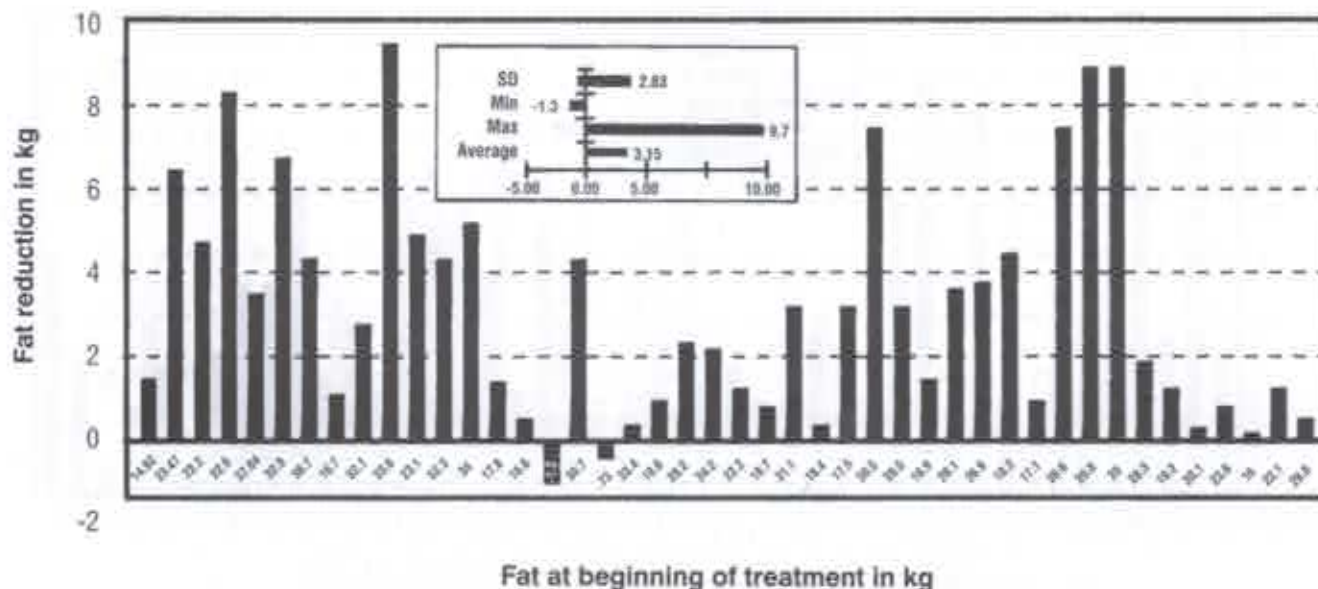
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 Exercise Therapist Brand

Weight reduction Combined group



SD = Standard Deviation

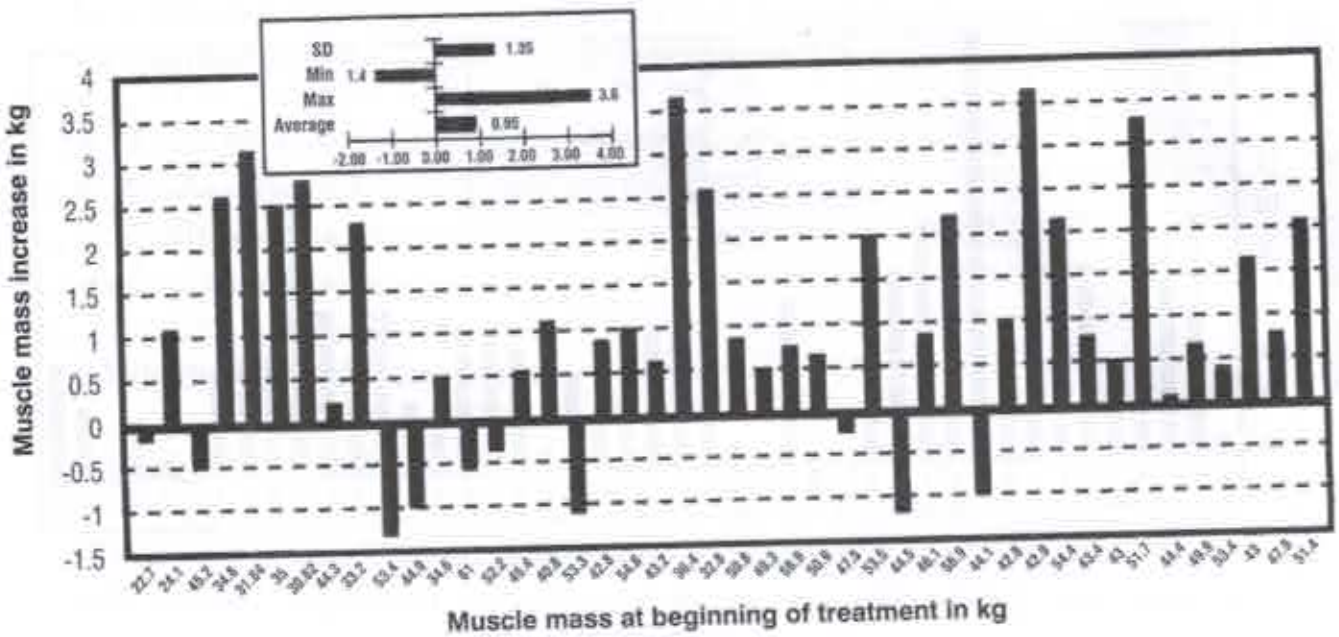
Fat reduction Combined group



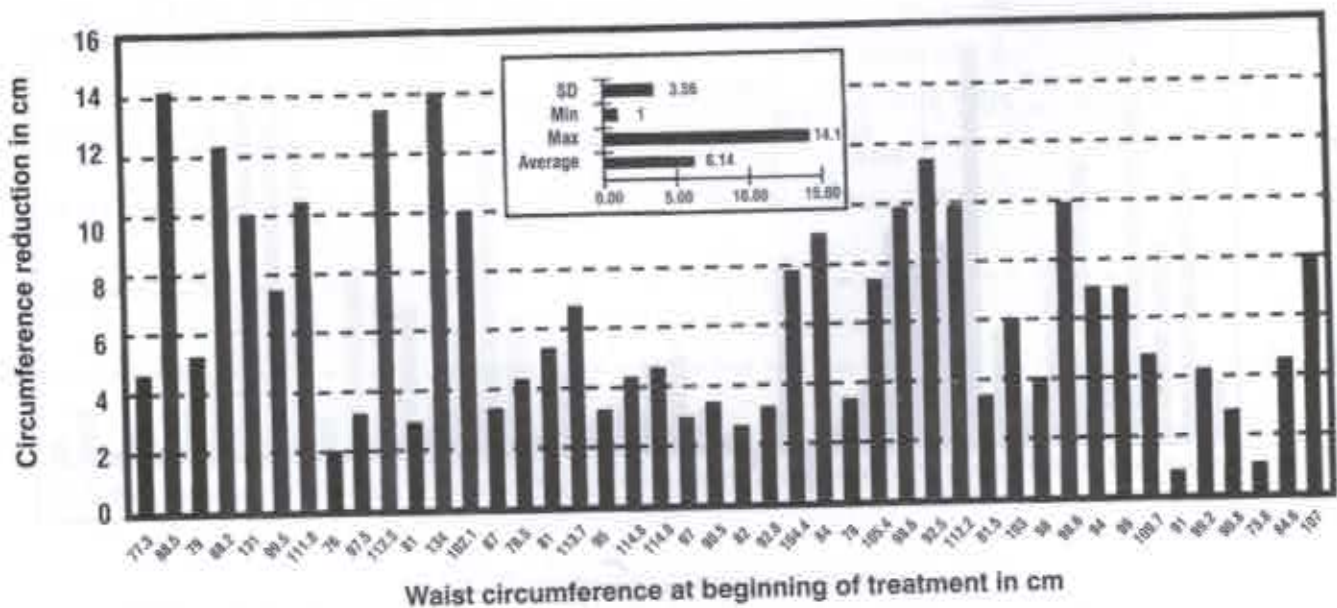
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Musculature Combined group



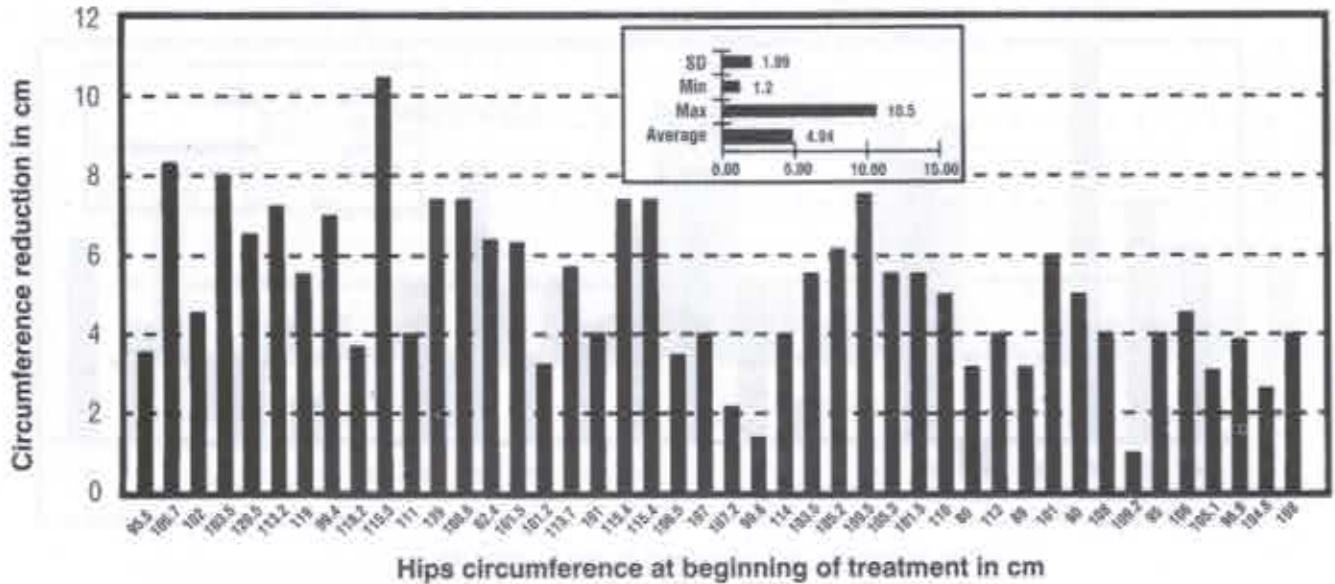
Waist Combined group



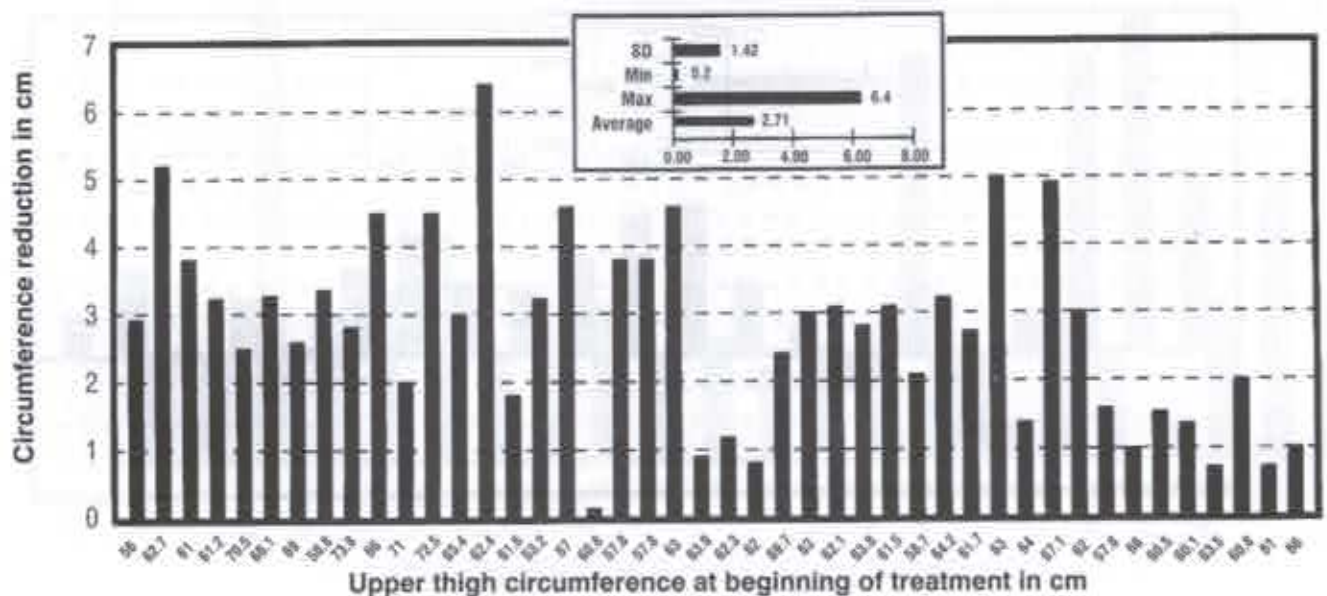
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Hips Combined group



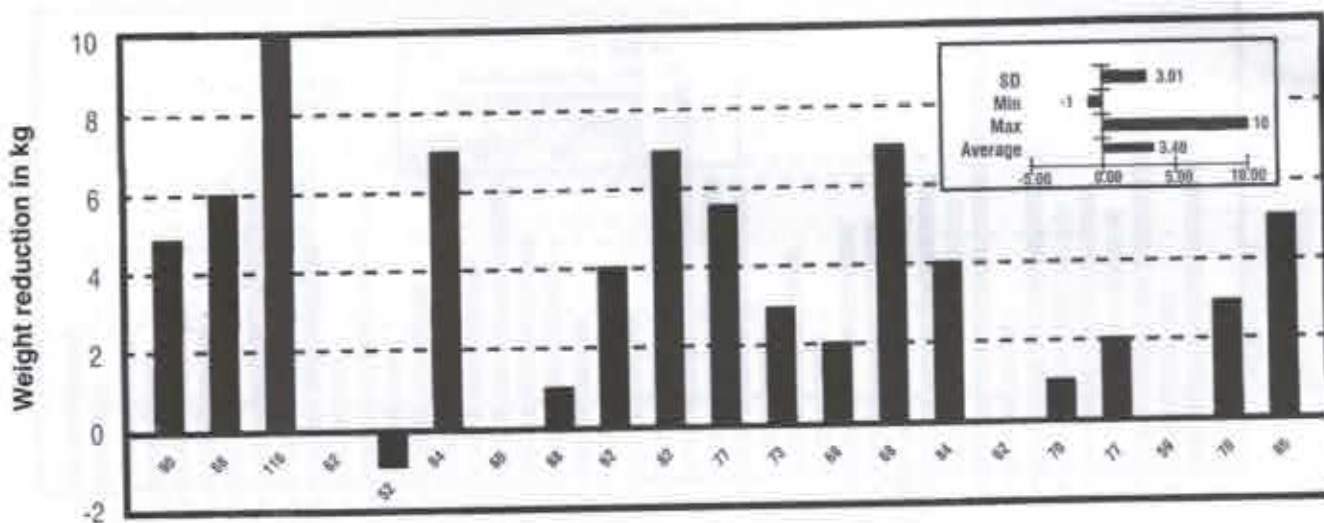
Upper thigh Combined group



Study of Electronic Muscle Stimulation
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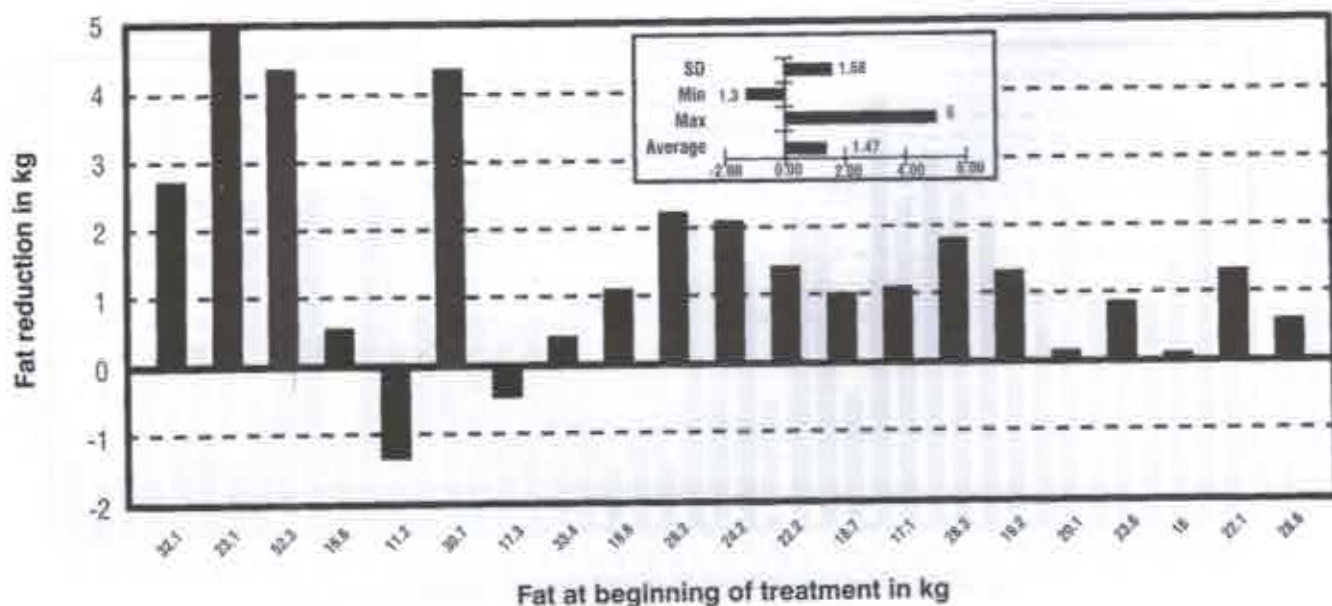
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Weight reduction Without nutritional guidance



Weight at beginning of treatment in kg

Fat reduction Without nutritional guidance

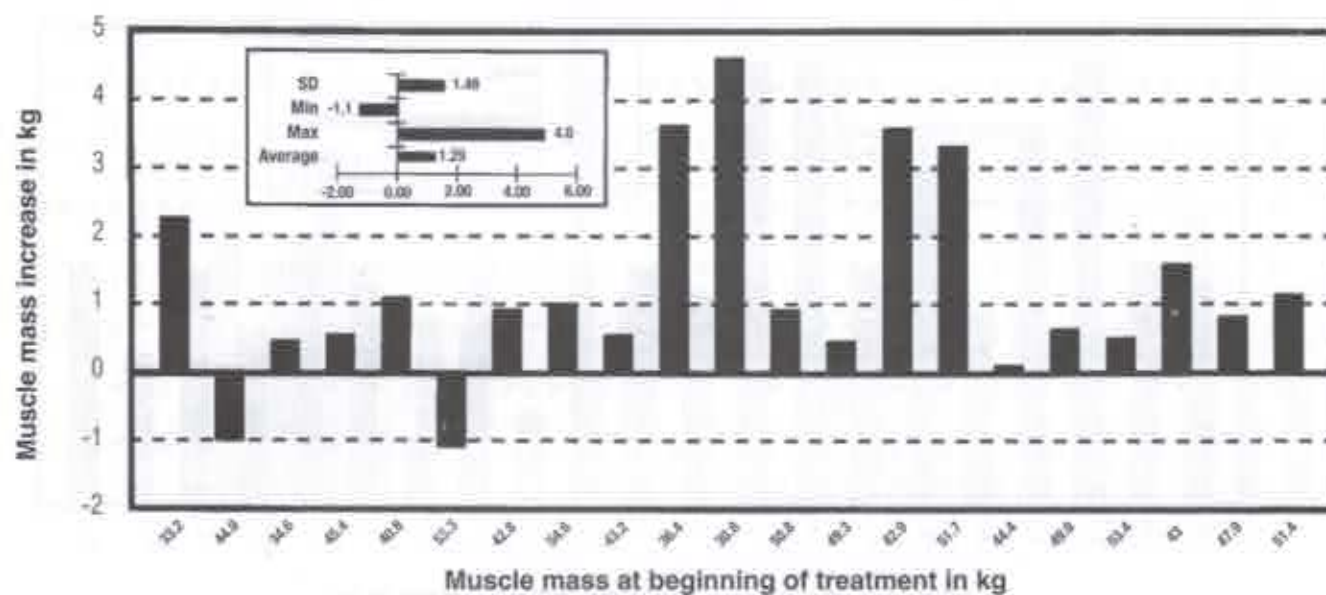


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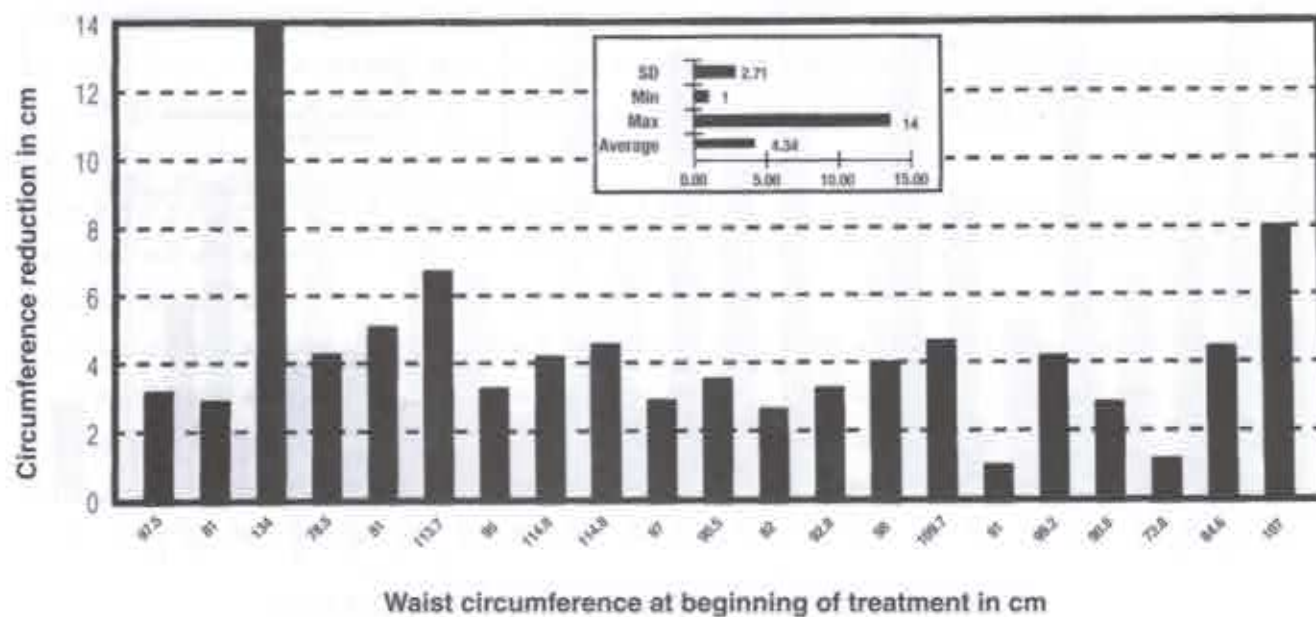
Musculature

Without nutritional guidance



Waist

Without nutritional guidance

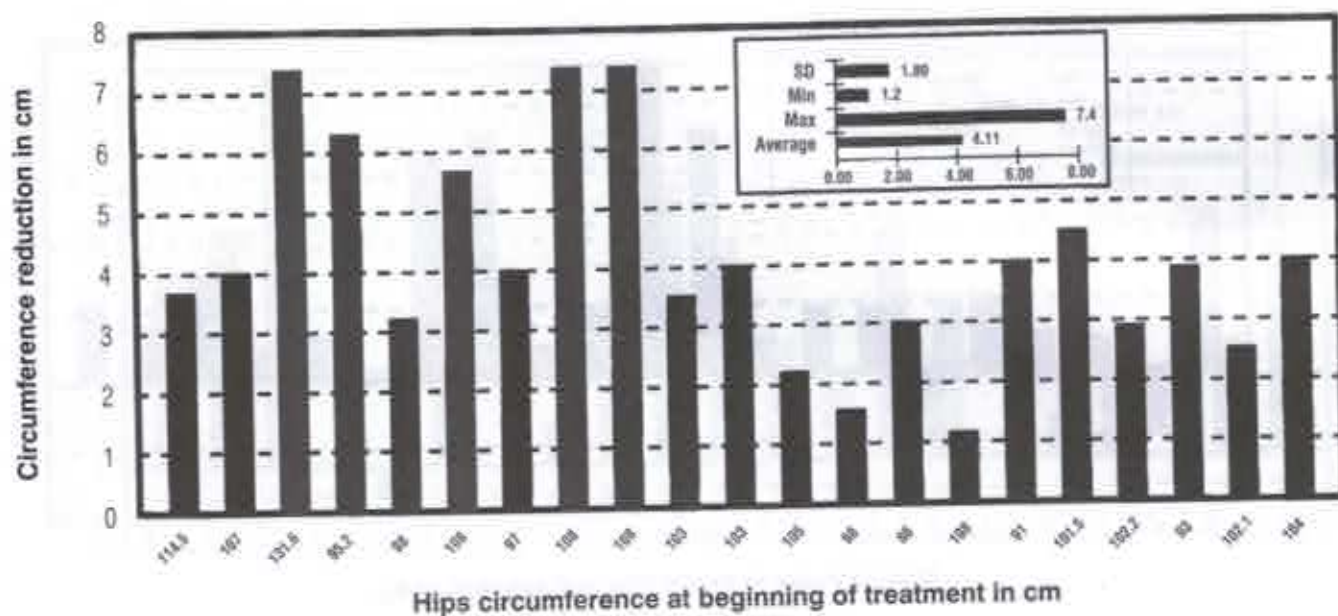


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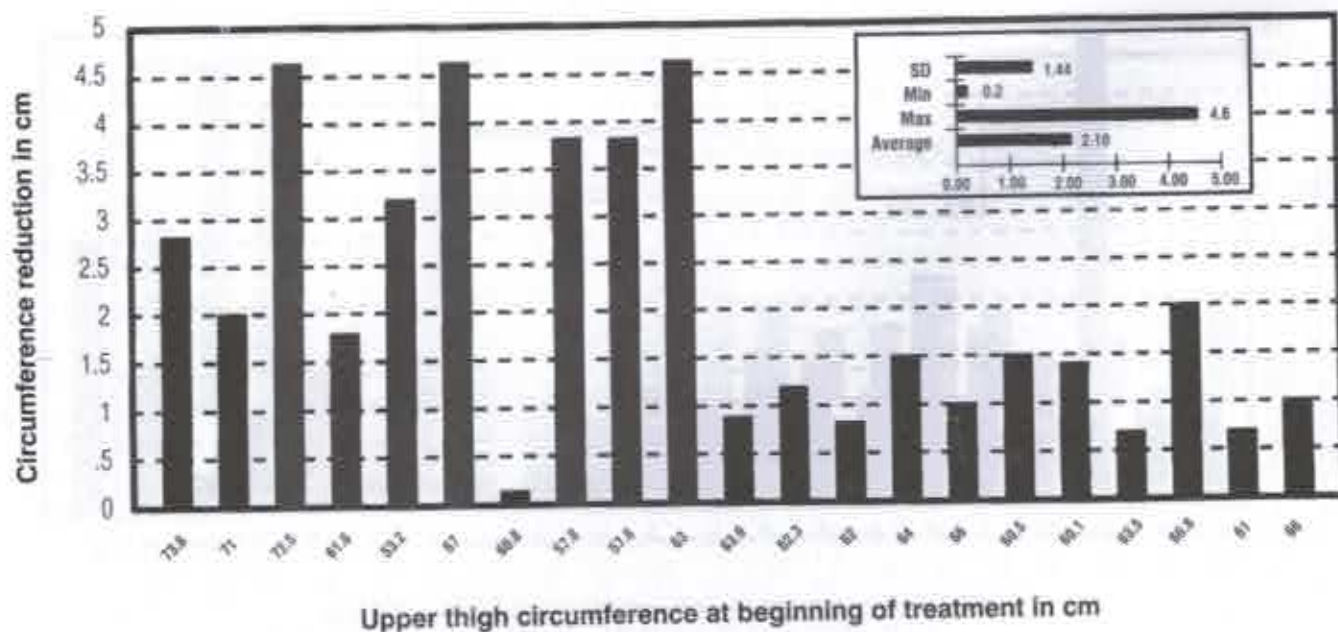
Hips

Without nutritional guidance



Upper thigh

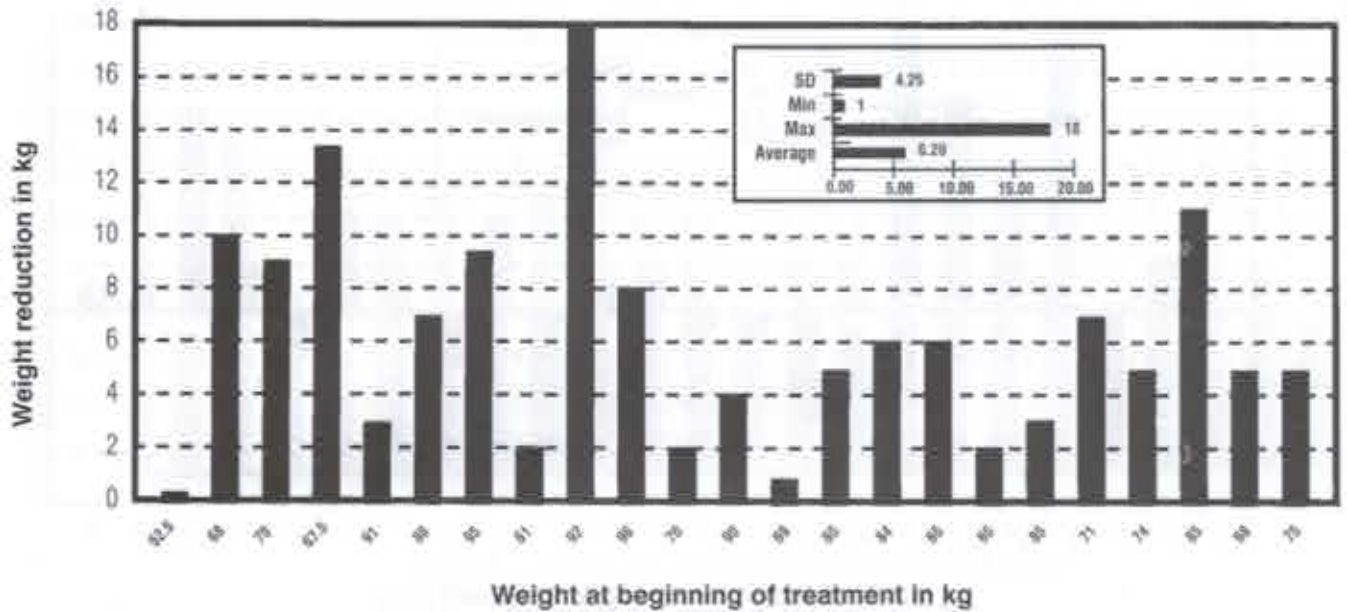
Without nutritional guidance



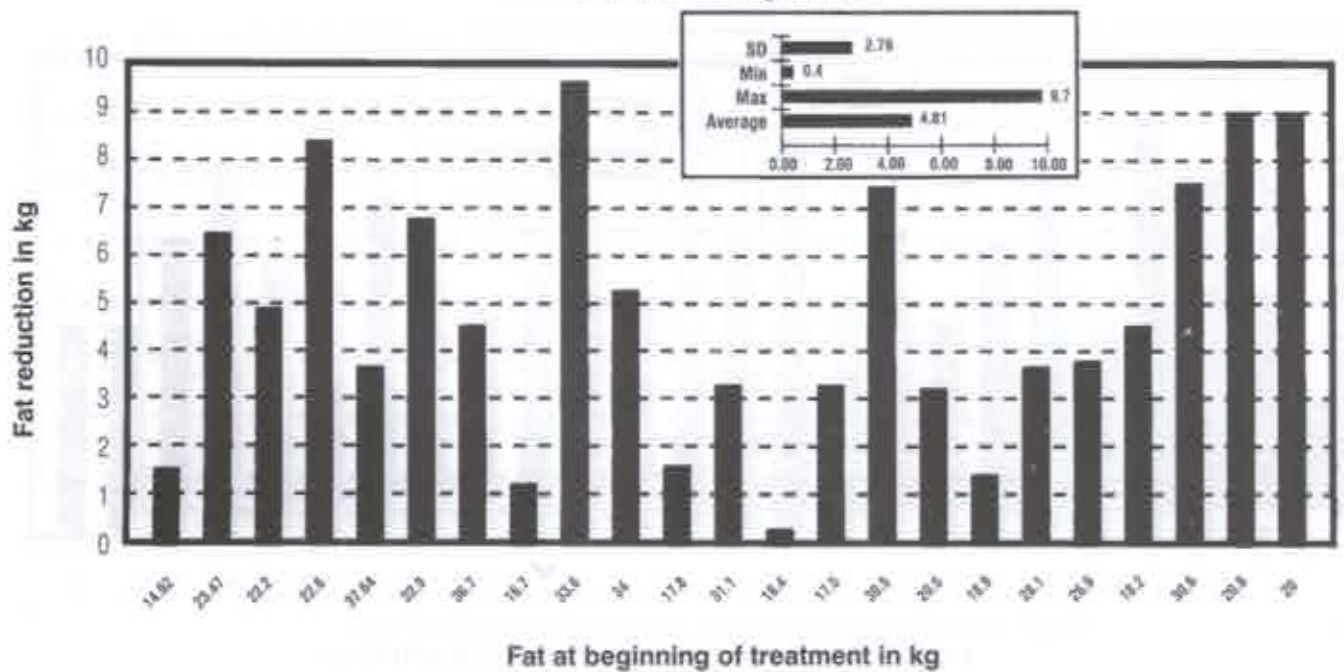
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Weight reduction With nutritional guidance



Fat reduction With nutritional guidance

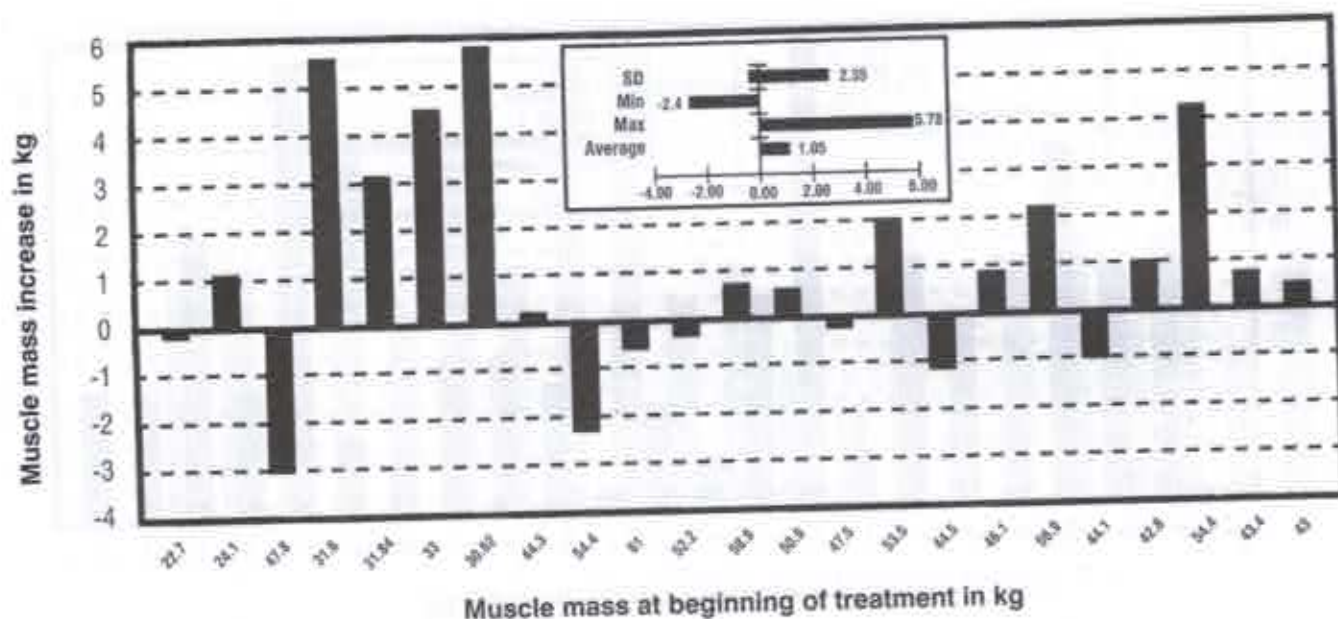


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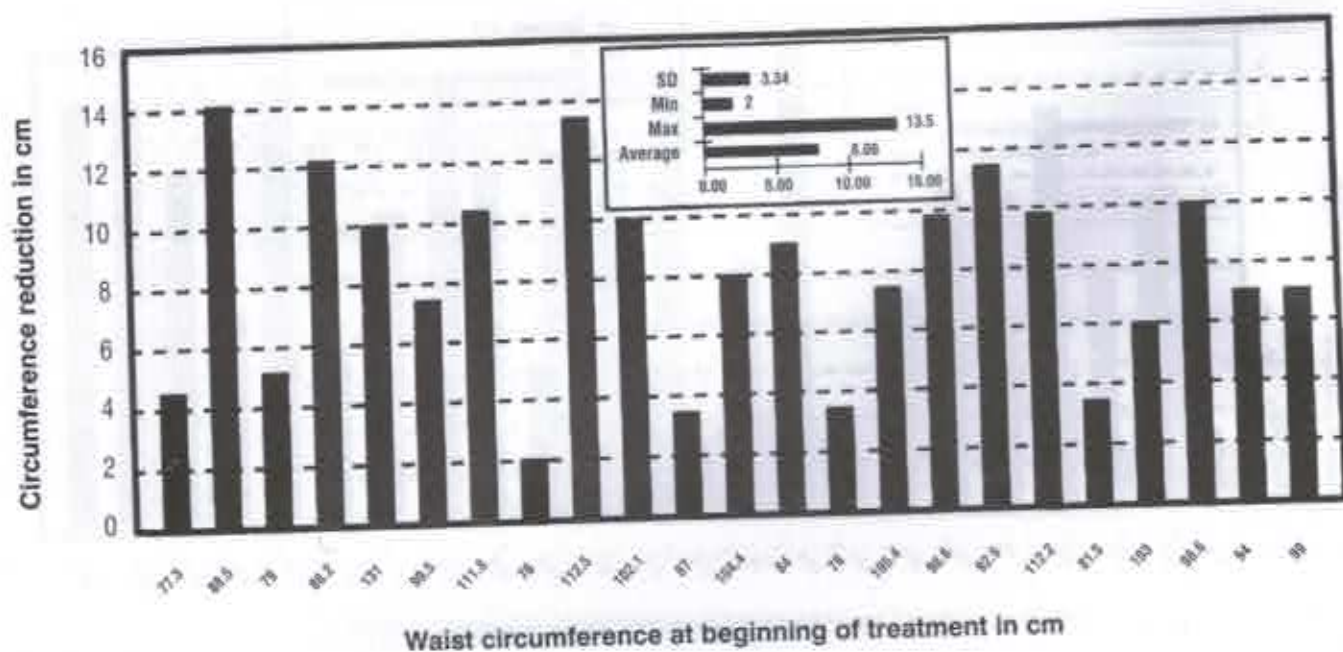
Musculature

With nutritional guidance



Waist

With nutritional guidance

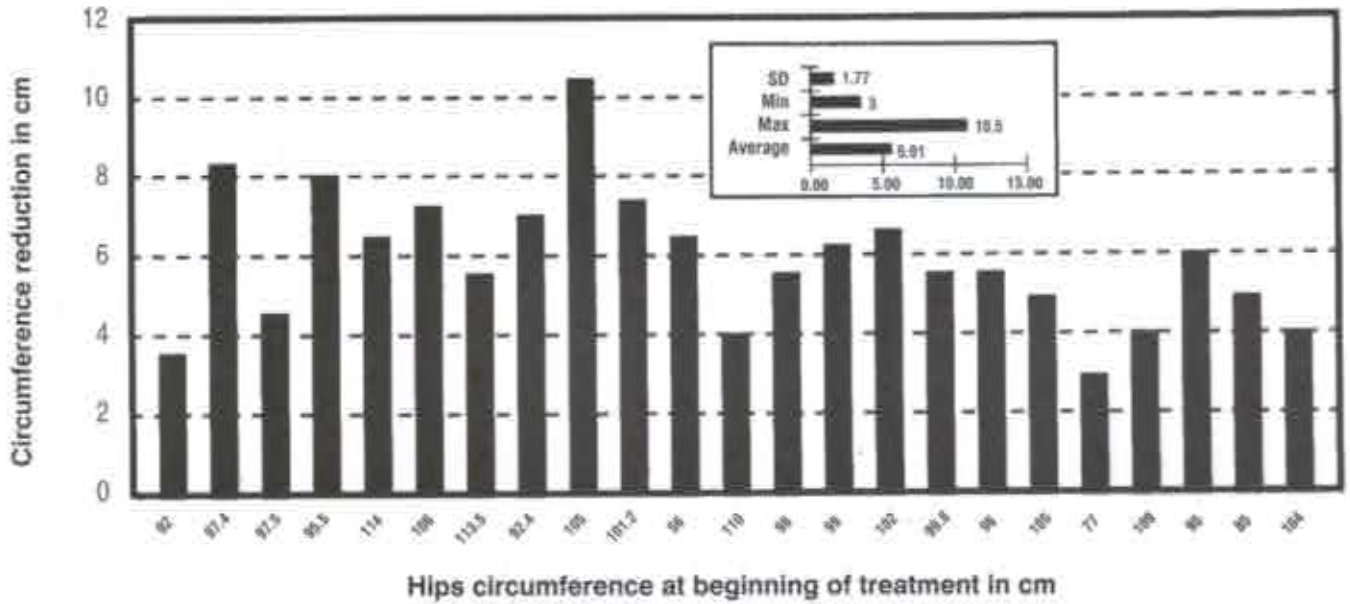


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Hips

With nutritional guidance



Upper thigh

With nutritional guidance

