

Clinical Study

Subject: Effectiveness of the Treatment of Cellulite Using the Aquaphoresis Principle

Place of Testing: Prague, C-BB center

Date of Testing: November 2004 - January 2005

Introduction

This study focuses on the assessment of effectiveness of using the treatment based on aquaphoresis principle for cellulite (orange skin). The study includes the effectiveness analysis of the treatment by aquaphoresis device.

The observations within this study were carried out on 68 patients, who were taking part in cellulite therapy in the Centre of Aesthetic Medicine in Seattle, USA in November 2004 – January 2005.

The study was completed by 62 out of the initial 68 patients, aged between 18 and 57, in whom cellulite in various stages had been observed.

General Conditions for Application of the Method

Clients from the cellulite sample group were treated by aquaphoresis using the laser & electrotherapy device.

Application of the active substance was performed for 4 weeks in 9 treatments – the 1st week 3, from the 2nd till the 4th week 2 treatments each week. The same length, intensity and other parameters of the treatment were applied at the clients regardless of age and cellulite stadium.

Aquaphoresis Therapy Method

The method is a combination of biostimulative laser therapy and 3 types of electrotherapy. The initial part carries energy into the target subcutaneous fatty tissue and thus erodes its fundamental bonding structure. The second part includes the main focus of the therapy – aquaphoresis – transport of active substances into the target tissues by means of electric current. The third part of the therapy, besides the phoresis effect, includes the significant tonisation effect which activates the muscle under the tissue. The final part stimulates the lymphatic and blood circulation in the treated area and thus provokes new quality of metabolism in the target area.

Used Active Substances

The applied substance is water-based gel containing biologically-active substances. The following ingredients have particular effect:

MSM-Methylsulfonylmethan – anti-inflammatory, stimulates growth of tissue cells

Caffeine – stimulates metabolism in the treated tissues

Carnitine – stimulates and accelerates combustion of fats in the target tissue

Arginine – directly affects reduction of subcutaneous fat and prevents its repeated settlement

The used mixture contains also other substances with important supportive effects.

Process of a Therapy Session when Applying Therapy by means of Aquaphoresis Principle

(total duration: 25 min)

1. application of LLLT – laser cluster (5 min)
2. aquaphoresis with active gel (10 min)
3. muscle tonisation (5 min)
4. stimulation of lymphatic circulation (5 min)

Age Structure of Patients and Initial Status of the Treated Problem

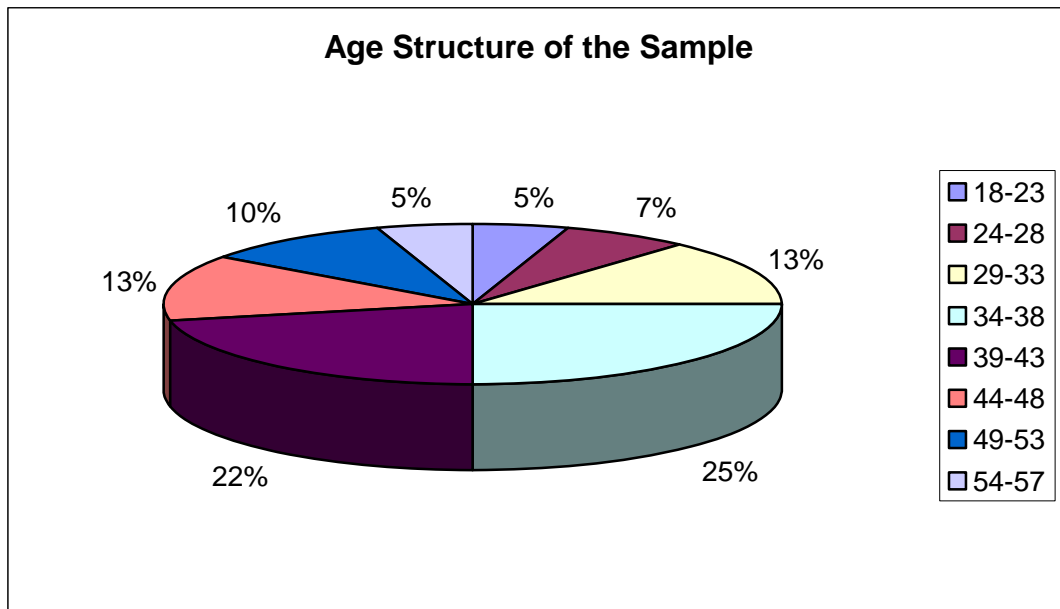
From the view of the age, the patients were selected in the way that all age groups of grown women were included approximately in accordance with normal (Gauss) distribution. As for the stage of cellulite, only the patients with the cellulite problem at least in the first stage (mild symptoms) were selected.

For the sample we finally chose 60 clients, excluding extreme values and with regard to keeping the Gauss distribution age structure.

Table 1 – Age Structure of Patients in the Sample

Age Structure of the Sample	
Age	Number of Patients
	Sample
18-23	3
24-28	4
29-33	8
34-38	15
39-43	13
44-48	8
49-53	6
54-57	3
In total	60

Graph 1 – Age Structure of Patients in the Sample



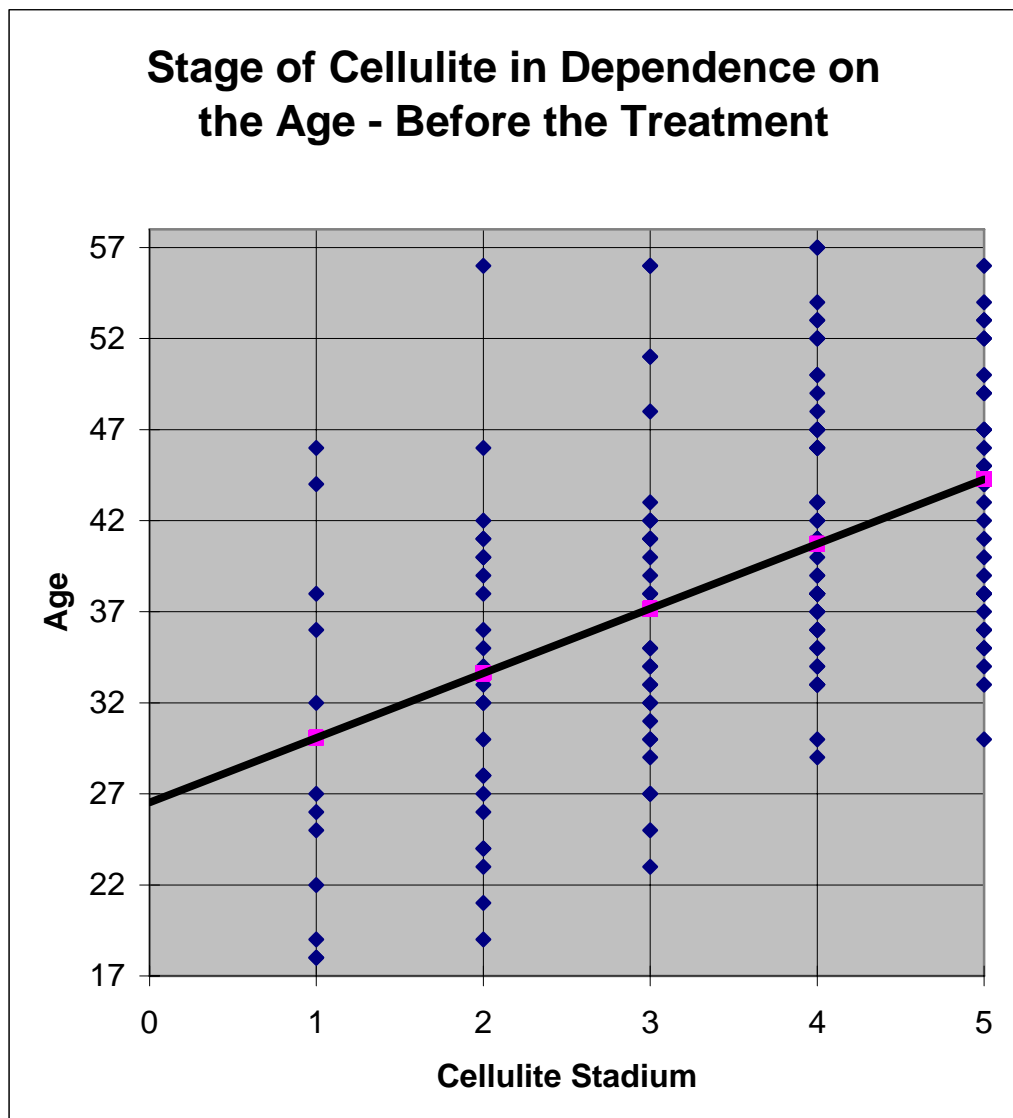
For the purposes of analysis of results we divided the stages of cellulite in the following way:

Stage

- 0-no symptoms
- 1-mild symptoms
- 2-local mild
- 3-medium serious
- 4-serious
- 5-severe chronic

The following graph shows how the cellulite stage depends on the age. The blue points are individual patients of a particular age and cellulite stadium. The yellow line represents linear projection of observed values. Generally it means that an average client of the tested sample aged e.g. 42 has cellulite between 4th and 5th stage.

Graphs 2 - Point Graph of Division of the Stage of Cellulite in Dependence on the Age



The ascending direction of the regression curve proves positive dependence of cellulite stadium on age of patients in the tested sample which corresponds to general trend observed in the population.

Results of Testing

For better comparability of not only the overall effectiveness of the treatment method we carried out the analysis of results after each treatment, so it is possible to compare not only the total result of application but also the time course of the therapy results.

We recorded the results in the client's card, which, besides the personal data of the client, included basic body measures (height, weight, BMI) and basic medical history in relation to the occurrence of cellulite (e.g. somatotype, genetic disposition, diets undergone, changes of weight within the last 12 months...etc.)¹.

The patients were instructed not to change significantly their movement and feeding habits at the time of the therapy, to prevent distortion of results.

For the comparison of the effects we selected the following criteria:

- average cellulite stage – i.e. characteristics created according to the formula:

$$s_x = \frac{\sum_{i=1}^{60} a_i}{60}$$

by comparison of these values before the therapy and in individual stages it is possible to find out the effectiveness of the therapy from the view of the entire group

- relative change of the cellulite stage – expresses the relative change of the average cellulite stage in the group

$$s_{rx} = \frac{s_{cx} - s_{c(x-1)}}{s_{c(x-1)}} \cdot \frac{1}{100}$$

- number of patients in whom an improvement by at least one stage has occurred – characteristics b_x , which is the sum of observations, for which the condition $[(s_{cx} - s_{c(x-1)}) \geq 1]$ is true
- number of patients in whom an improvement by at least one stage in relative expression has occurred; mathematically:

$$b_{rx} = \frac{b_x - b_{x-1}}{b_{x-1}} \cdot 100$$

¹ analysis of the influence of these factors on the occurrence of cellulite and successfulness of its treatment will be probably the subject of the author's next study

Aquaphoresis Treatment

The results of the applied therapy are in Table 2.

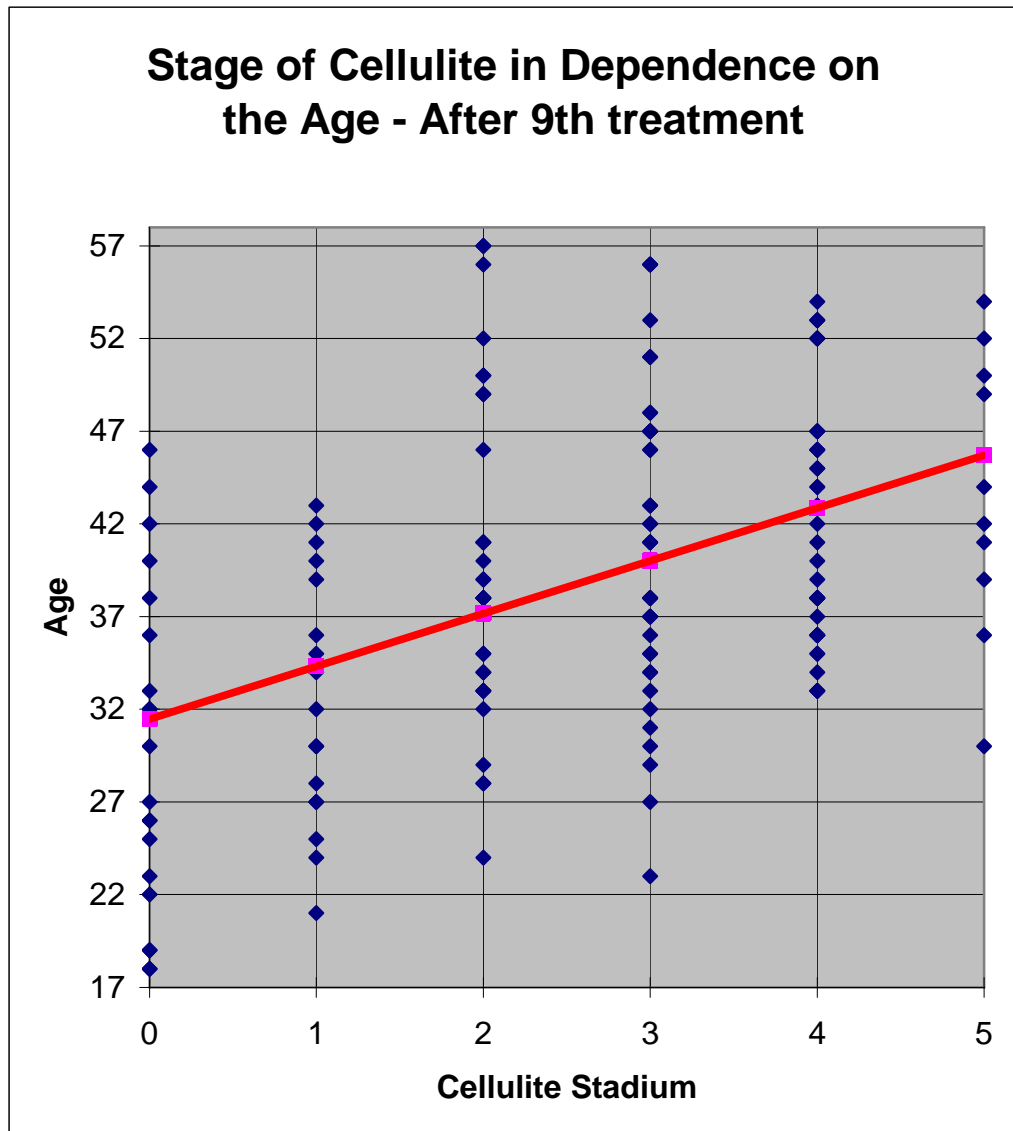
Table 2 – Therapy Results

Therapy Results				
x	beginning	3	6	9
s_{c_i}	3.481	2.981	2.769	2.600
s_{r_i}	-	16.77%	7.67%	6.49%
s_{r_T}	33.89%			
b_i	40			
b_{r_i}	66.67%			

Parameter s_{r_T} - average improvement of cellulite by 33.89% (i.e. 0.881 stage). In addition the results imply that the effectiveness of the therapy also decreases together with the progress of therapy (from 16.77% after first three sessions to 6.49%). The improvement by at least one stage of cellulite has been noticed in 40 patients, which is 66.67% of the entire sample.

Results of the therapy program can be displayed in a similar regression table as at the beginning.

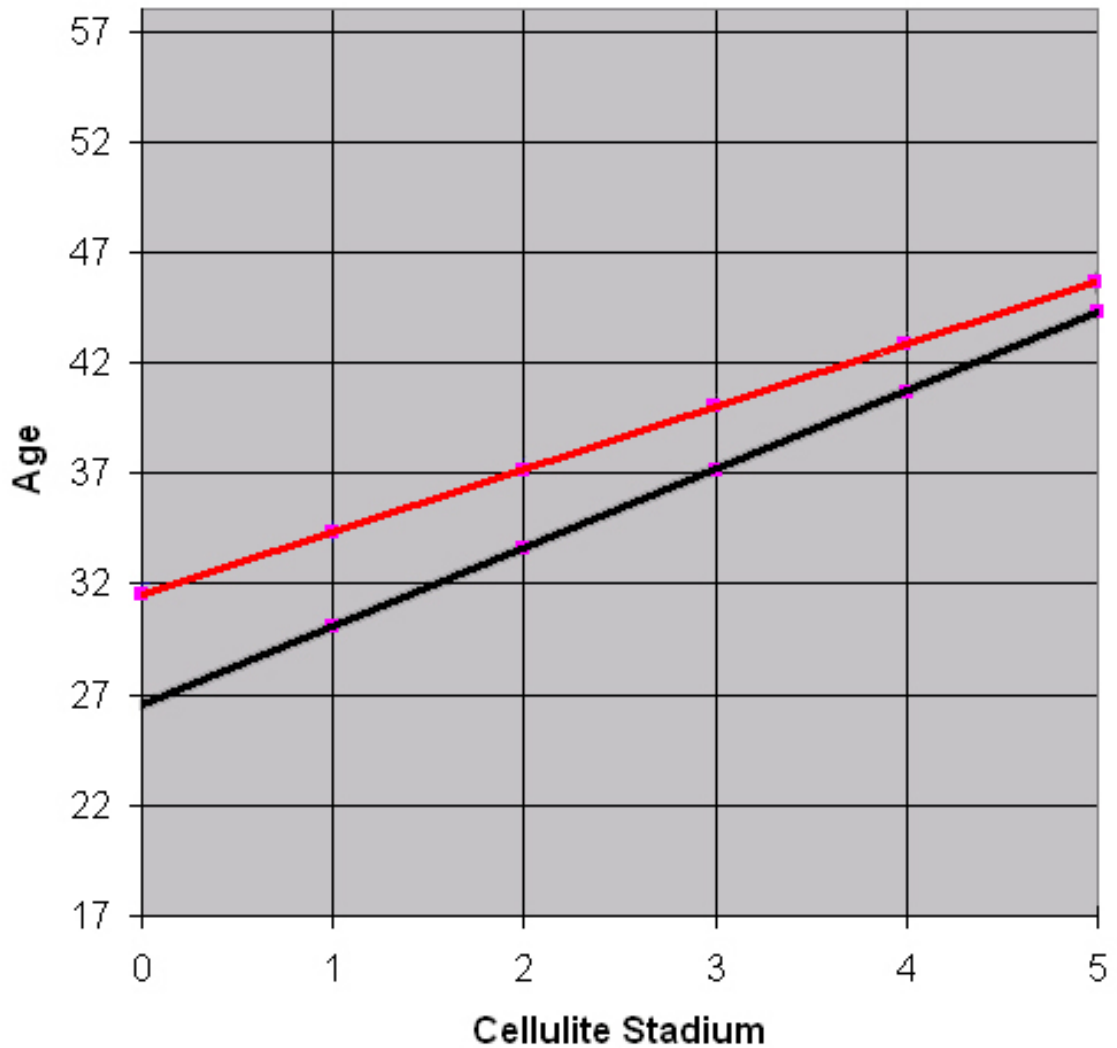
Graphs 3 - Point Graph of Division of the Stage of Cellulite in Dependence on the Age – After 9th Treatment



By joining both regression curves into one graph we get comparison which shows the total effect of the therapy program. The After-Line (red) is situated more to the left which displays total average improvement in the whole sample. In details the graph shows e.g. that at a client aged 32 the average result is the improvement by more than 1 cellulite stage.

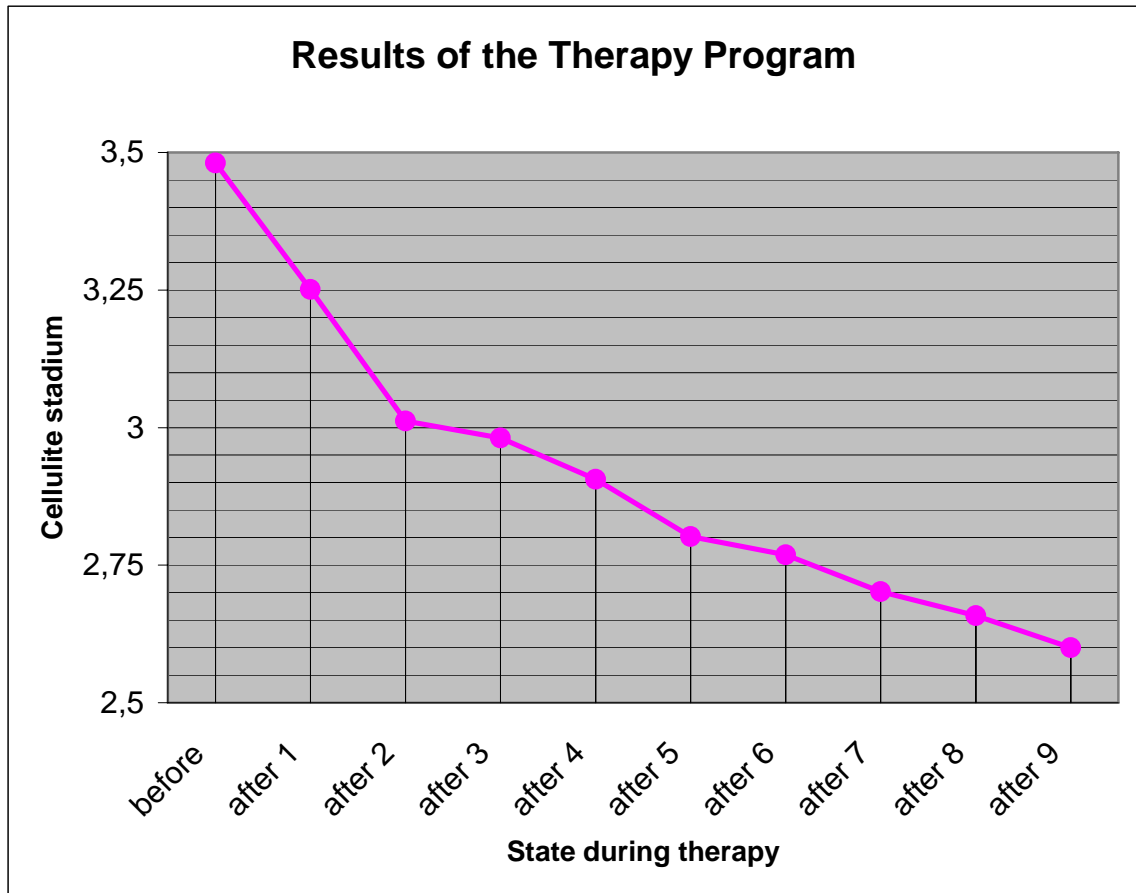
Graphs 4 – Comparison of the Before and After Stage of Cellulite in Dependence on the Age

Comparasion Before and After - Cellulite in Dependence on the Age



Based on the observed results it can be concluded that the 9-session treatment of cellulite using the aquaphoresis device provided the average improvement by one cellulite stadium. The way of improvement is not linear, which is displayed in graph 5.

Graph 5 – Line Graph of the Progress of Therapy



Conclusion

On the observed sample the study proved that the cellulite treatment using device with aquaphoresis principle was significantly effective. Although not reaching linear progress in the effect of the treatment process, the whole duration of the process brought indispensable improvement. Concerning the influence of age on the treatment effectiveness, it was observed that age had slight influence on effectiveness of the treatment, but statistically it was insignificant.