VERIFICA DELL’EFFICACIA DI FLOWAVE TRAMITE L’INFOSCINTIGRAFIA
(European Journal of Limphology 2005)
Demonstration of Flowave’s effectiveness through lymphoscintigraphy


Dott. Maurizio Ricci
MFT Simona Paladini

SUMMARY: The authors clinically verified the effects and the effectiveness of a new electromedical instrument named Flowave. This instrument uses mechanical waves to influence interstitial proteins in lymphoedema. The study’s protocol (50 patients) used lymphoscintigraphy to verify Flowave’s effects. In conclusion the study demonstrated Flowave stimulates progression lymphatic liquids, activates apical limbs lymph nodes, reduces derma back flow.

Key words: sonorous resonance, lymphoedema, sound waves.

Flowave is an electro-medical instrument which produces mechanical waves (low frequency sound waves like infrasounds) which are able to interfere in the biological processes of the organism tissue and especially used in treatment of oedema. It was first introduced like an evolution of the MLD, though it is together a “biological” and “mechanical” method. It mechanically stimulates the lymphatic ways and it acts in the treated area through means of a molecular activation.

It works with the activation of the proteins (1-2-8) included those contained in the lymph, according to the physical process of the sonorous resonance (3): each sonorous source emits sounds with a characteristic frequency. If it is invested by a sound wave emitted by another source of clearly various frequency, it behaves like a rigid system and it doesn’t modify itself. If the frequency is the same or a little different, the source enters in oscillation and starts to emit sounds which reinforce the first sound: this is the resonance. It is famous the example of a violin placed in a room and which enters in sonorous resonance with another violin in the same room, stimulated by a musician.

In the biophysical studies it is considered that the amino-acids behaviour, or the behaviour of a proteic aggregate, is like a system able to oscillate, with its own frequencies. Therefore every time this oscillating system is subordinate to a periodic series of impulses, of equal frequency or nearly, this last one will oscillate (bioresonance) (4-5-6-8-9) with proportional amplitude to the energy by which it was hit. So the structure of amino-acid and/or protein will be pushed towards or into the Flowave consists of a source which emits a compensated two-phases wave, of amplitude between -12 and +12 Volts. The low energy of this wave does not induce any irreversible modification to the tissues under treatment (7).

The emitted wave consists of a periodic modulated square wave, able (according to Fourier’s theorem) to generate an harmonica (wave) with multiple frequencies of the main one. The emission of the main harmonica is never pure but it is always together with other harmonicas, with smaller intensity, whose frequency is generally multiple of the main one. These last ones are said harmonics.

Such harmonics, even if with a minimal amplitude, succeed in stimulating the proteins, and not only: thanks to the inner mechanisms of amplification of the human body, they allow Flowave to strengthen several macromolecules with frequency of various resonance (10-11).
A lymphatic oedema is a pathology characterized by a high interstitial proteinous concentration which recalls and keeps water molecules in the interstice and so it favours fibrosis. For an efficient and long-lasting therapeutic effect it is necessary to remove these substances from the interstice in order to be followed by the water molecules.

Lymphoscintigraphical and ultrasonographic studies with high resolution have demonstrated that by using sound waves it is possible to activate interstitial proteinous molecules, allowing their removal.

Sound waves also stimulate some intracellular proteins, activating metabolic processes revealed by the expulsion of cellular products (3-5-6-7). These data caught our attention and induced us to clinically verify the effects and the effectiveness of Flowave with lymphoscintigraphy.

So, we set up a protocol with the following criteria of inclusion:

• patients with lymphedema, primary or secondary, mono or bilateral, of the superior or inferior limb;
• initial stage (at least) 2 months;
• stage of the lymphedema between 2° and 4°;
• they were not receiving other treatments and the chronic patients observed a therapeutic wash out for at least 6 months.

Criteria of exclusion:

• presence of pacemakers
• presence of metallic devices in the limb to treat
• systemic disease
• pregnancy.

The study method was represented by:

• clinical control made by the same operator;
• centimetric measurement (7 points on the superior and inferior limb) made at the beginning and at the end of the cycle treatment with Flowave;
• picture of the limbs in the two controls;
• lymphoscintigraphy before and after the treatment always made by the same operator;
• daily therapy only with Flowave, all made by the same operator using a standardized program.

The cases report:

from 18.12.2002 to 29.11.2004 50 patients have been found with the aforesaid characteristics.

Medium age 55 years (22-83). Medium insurgence 25 months. 18 of them were treated with radiotherapy and 32 without it.

The aetiology divided them in:

• 10 cases of venous lymphoedema of the inferior limbs,
• 3 primary lymphoedema of inferior limbs,
• 8 secondary lymphoedema of the inferior limbs,
• 28 secondary lymphoedema of the upper limbs post-mastectomy,
• 1 lipolymphoedema of the inferior limbs.

The number of treatments was variable from 9 to 14; the period between the execution of the first lymphoscintigraphy and the beginning of the therapy never exceeded 2 days while the time between the end of the sitting and the second lymphoscintigraphy was variable from 1 to 7 days.

Verification of results

In all cases the patients have reported a good adaptation to the received treatment. The feeling of gravity and hardening of the limbs has been eliminated in all cases. Chronic patients stopped any other therapies for about 6 months before starting this treatment. In the meanwhile the operator positively estimated the methodical execution of the performance.

Clinical results

The clinical control allowed to verify the reduction of the tension of the cutaneous and subcutaneous tissues in 100% of the cases.

The measurement of the centimetric delta (difference between the two limbs) before and after the therapeutic cycle showed a reduction of 74% (37) divided into:

<table>
<thead>
<tr>
<th>N</th>
<th>N cases with reduction of the delta</th>
<th>per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venous Lymphedema</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Primary Lymph. Of I. L.</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Secondary Lymph. Of I. L.</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Secondary Lymph. Of U. L.</td>
<td>28</td>
<td>16</td>
</tr>
<tr>
<td>Lipolymphedema</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>37</td>
</tr>
</tbody>
</table>

Lymphoscintigraphic results

In order to describe the Lymphoscintigraphic exams in this article we explained the results in:

progression of the radioisotope, visualization of the apical lymphadens, stagnation of radioisotope.

We valued each result between 0 to ++ and compared them before and after treatment.

We obtained:

Progression of the radioisotope

• In 21 of 38 cases (57,3%) an improvement of the radioisotope progression speed;
• in 16 cases a ++ degree;
• only in 11 of 24 cases (46,6%) the degree remained 0.
In conclusion we demonstrated that Flowave can:
• induce a good progression of the radioisotope in 78% of the cases;
• induce an activation of the apical lymph nodes in 62% of the cases;
• facilitate a disappearance of ++ derma back flow in 52% of the cases.

**GENERAL BOARD**

**PRIMARY LYMPH. OF I. L.**

<table>
<thead>
<tr>
<th></th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>P</td>
<td>LN</td>
<td>LN</td>
<td>DBF</td>
<td>DBF</td>
<td>P</td>
<td>P</td>
<td>LN</td>
<td>LN</td>
</tr>
<tr>
<td>B.G.</td>
<td>0/+</td>
<td>++</td>
<td>m</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>++</td>
<td>0/+</td>
<td>m</td>
<td>0</td>
</tr>
<tr>
<td>Q. D.</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
</tr>
<tr>
<td>B. A.</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
</tr>
</tbody>
</table>

**VENOUS LYMPHEDEMA**

<table>
<thead>
<tr>
<th></th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>P</td>
<td>LN</td>
<td>LN</td>
<td>DBF</td>
<td>DBF</td>
<td>P</td>
<td>P</td>
<td>LN</td>
<td>LN</td>
</tr>
<tr>
<td>A. M.</td>
<td>++</td>
<td>++</td>
<td>m</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
</tr>
<tr>
<td>A. C.</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
</tr>
<tr>
<td>G. F.</td>
<td>0/+</td>
<td>++</td>
<td>m</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>++</td>
<td>0/+</td>
<td>m</td>
<td>0</td>
</tr>
<tr>
<td>B. G.</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>m</td>
<td>++</td>
<td>++</td>
<td>m</td>
<td>++</td>
</tr>
<tr>
<td>C. A.</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
</tr>
<tr>
<td>M. P.</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>++</td>
</tr>
<tr>
<td>G. G.</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>++</td>
<td>++</td>
<td>m</td>
<td>++</td>
<td>++</td>
<td>m</td>
<td>++</td>
</tr>
</tbody>
</table>

**SECONDARY LYMPH. OF I. L.**

<table>
<thead>
<tr>
<th></th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
<th>I control</th>
<th>II control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>P</td>
<td>LN</td>
<td>LN</td>
<td>DBF</td>
<td>DBF</td>
<td>P</td>
<td>P</td>
<td>LN</td>
<td>LN</td>
</tr>
<tr>
<td>C. M.</td>
<td>0/+</td>
<td>0/+</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
</tr>
<tr>
<td>G. A.</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0/+</td>
<td>0/+</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
</tr>
<tr>
<td>Q. O.</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0/+</td>
<td>0/+</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
</tr>
<tr>
<td>T. A.</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0/+</td>
<td>0/+</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
</tr>
<tr>
<td>G. L.</td>
<td>0/+</td>
<td>0/+</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
</tr>
<tr>
<td>T. L.</td>
<td>0/+</td>
<td>0/+</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
</tr>
<tr>
<td>S. M.</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
</tr>
<tr>
<td>S. A.</td>
<td>++</td>
<td>++</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
<td>0</td>
<td>s</td>
<td>0</td>
</tr>
</tbody>
</table>

Stagnation of radioisotope (derma back flow)

• 17 of 34 cases (50%) reduced the radioisotope stagnation;
• 10 cases out of 34 (29.4%) got 0;
• only 8 out of 22 remained ++ (26.3%).
Conclusive considerations

• These results are acceptable in order to estimate the executed protocol and Flowave efficacy.
• The methodical demonstrated to be able to give positive answers to the clinical plan; this also agrees with the standard parameters considered by all the operators and guidelines.
• The application of Flowave was very appreciated either by the operators or by the patients.
• In chronic patients (who had received a decongestive therapy) was demonstrated a tendency to maintain the obtained results longer.

AUTHORS
Dott. Maurizio Ricci, Direttore U.O. Medicina Riabilitativa Azienda Ospedaliera Umberto I Ancona
MFT Simona Paladini, U.O. Medicina Riabilitativa Azienda Ospedaliera Umberto I Ancona

Bibliography
Lubert Stryer, Biochimica. Ed. Zanichelli
Reed, B.V. (1988) “Effects of high voltage pulsed electrical stimulation on microvascular permeability to plasma proteins”. In: Phisical Therapy 68: 491-495
LA VIA LINFATICA. Imaging e linfa

Fig. 1 LINFEDEMA POST-MASTECTOMIA ARTO SUP DX. A. S. SIN NORMALE

Derma back flow

Stazioni linfonodali gomito ed ascella

Fig. 2 LINFEDEMA POST-CHIRURGICO ARTO INF DESTRO

Via linfatica normale

Non visualizzata la via a destra

Fig. 3 FLEBOLINFEDEMA ARTI INFERIORI

MARZO 2004

APRILE 2004

Dopo progressione molto aumentata, ridotto volume arti.