

# Therapeutic Effect of Very Low Powered Hertzian Wave Transmissions.

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## SUMMARY

Following observations which we published in 1975 on the beneficial effects of high frequency electromagnetic waves, we accepted an invitation from Mr. Fellus to make the first clinical observations with his miniaturised *FEL* apparatus. We were surprised by the unexpected and frequently exceptional results obtained in a diverse range of indications e.g. Control of pain and oedema, injury, general and orthopaedic surgery, skin diseases, vascular conditions. No contra-indications or side effects were noted. We believe that its introduction will cause a significant evolution in medical therapy and an expanded scope for physical medicine.

## Introduction

### HISTORY

Although d'Arsonval and others at the turn of the century envisaged therapeutic properties linked to the field effect of electromagnetic energy, therapeutic application of electromagnetic waves located between the infra-red radiations and the VHF band radio waves only began around 1947, particularly following the work of Krusen.

These waves were applied principally as a continuous transmission, and their therapeutic effect was considered to be primarily due to their deep heating action.

At the beginning of the nineteen fifties, Dr. Ginsberg devised the *Diapulse* apparatus in collaboration with the physicist Millinowsky, which produced a pulsed (interrupted) transmission rendering it possible to raise the intensity of the energy transmitted whilst keeping the thermal effect to a minimum.

d'Arsonval's opinion was confirmed by the results obtained in diseases which could not be treated by means of conventional Hertzian wave transmissions in view of their heating action.

Thus, areas with high sensitivity such as skin ulcers, highly inflamed or poorly vascularised areas, and areas which contain osteosynthesis materials, could benefit from these treatments.

The observations published in 1975 nevertheless seem to show that the therapeutic effect of Hertzian wave transmissions is due to their heat generating action, at least if they are prescribed in the conventional way, that is for periods of 10 to 20 minutes 3 to 6 times weekly.

With arthritis and other joint diseases, significant results were obtained with new types of Hertzian wave transmitting apparatus, for example those marketed under the names

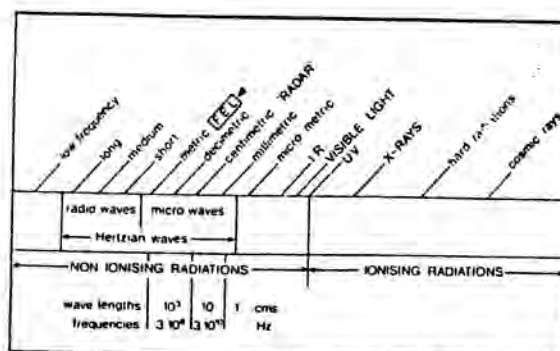


Table 1: Location of the *FEL* emission in the electromagnetic spectrum.

*Diatron* and *Thyrotherm*, which produce a pulsed wave transmission combined with a moderate or high thermal action.

However, within two years, a French physicist, M. Fellus, requested us to re-examine the accepted views on the therapeutic action of pulsed high-frequency electromagnetic waves. He asked us to perform the initial clinical tests on an apparatus called the *FEL* (Flexible Electromagnetic Units) which he had developed based on recent advances in electronics and on theories in fundamental physics which are hardly known to physicians.

We were surprised by the results, especially when comparing these to the results obtained with treating recent injury, particular rheumatic conditions, venous conditions and skin diseases as set out in our first publication.

|                         | CONVENTIONAL | F.E.L.       | DIAPULSE   | DIATRON THYRON |
|-------------------------|--------------|--------------|------------|----------------|
| FREQUENCY               | 2450 MHz     | 27 125 MHz   | 27 125 MHz | 2450 MHz       |
| WAVE LENGTH             | 12.25 cm     | 11m          | 11m        | 12.24 cm       |
| MAXIMUM POWER           | 200 W        | 0.5 W        | 975 W      | 1500 W         |
| No OF PULSES PER SECOND | —            | 200 400 600  | 8 to 600   | 1 to 50        |
| PULSE PERIOD            | —            | 1.6-4.9m sec | 1.67m sec  | 12.5m sec      |
| ACTION                  |              |              |            |                |
| ATHERMAL                | 0            | X            | X          | X              |
| THERMAL                 | X            | 0            | 0          | 0              |
| HIGH THERMAL            | 0            | 0            | 0          | 0              |
| ANTENNA SPACING         | AIR GAP      | SKIN CONTACT | AIR GAP    | AIR GAP        |
| VOLTAGE                 | 240 V        | 5 V          | 240 V      | 240 V          |
| DIMENSIONS              | 85x50x35cm   | 3x1.5x13cm   | 85x55x40cm | 85x54x37cm     |
| PRICE                   | xxx          | x            | xxxxxx     | xxxx           |

Table 2. Characteristics of the *FEL* apparatus compared with other electromagnetic wave transmitters.

The *FEL* apparatus is a miniaturised transmitter of electromagnetic waves having a negligible heating action, of very low power (approx 0.5 W as against 1,500 W for the *Diatron*) but which transmits by means of a flexible antenna which is conformable to and contacts the area which is to be treated. The flexible antenna constitutes one of the main original characteristics of the *FEL* apparatus. Thus the power loss imposed on the *FEL* apparatus by its miniaturisation, is actually compensated for when one considers that other conventional apparatus transmits by means of electrodes which are positioned at a distance of several centimetres from the skin.

On the other hand, contrary to our beliefs, it could be possible that the therapeutic effect of the high-frequency

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electromagnetic waves are not necessarily proportional to the power of the transmission.

The small size of the *FEL* apparatus and its relatively low purchase price make it possible to look at physiotherapy in a

new light.

Treatments with the *FEL* apparatus could easily be made daily, for several hours if need be, and possibly even to a bed-ridden patient.

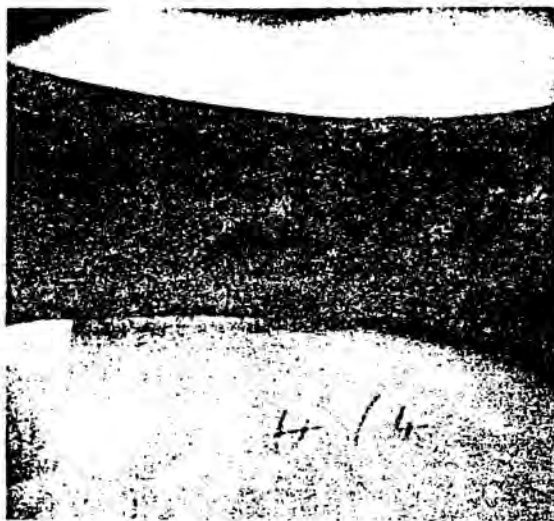


*Inside of leg*



*Outside of leg*

*18 Feb. Dor. Left leg. Prior to FEL treatment.*



*4 April. Dor. Healing completed after 6 weeks of treatment. The patient was considered cured and returned home, without further treatment.*

#### **First clinical observation of the therapeutic effect of the *FEL* apparatus**

We deliberately separated this case from the other observations which will be described in the next sections.

As a matter of fact, we embarked on our clinical experimentation with considerable doubt.

The surprising results secured with the first patient aroused our curiosity and persuaded the entire team to continue its endeavours actively.

#### **INITIAL REMARKS**

The new technology employed in the *FEL* apparatus and its early subjection to clinical tests, at the prototype stage, resulted in numerous breakdowns.

Even though the causes of the breakdowns were quickly rectified by the manufacturers, the patient was sometimes treated with a faulty apparatus for several days. Consequently

a mistake could have been made in assessing the therapeutic effect of the treatment.

Dor. Female aged 84, arterial ulcer (diabetic?) period of condition 5 years, progressive deterioration, pyocyanic superinfections, failure of all previous treatments, amputation scheduled within one month. Admitted to hospital 7 Feb 1977. Beginning of *FEL* treatment 18 Feb 1977.

*FEL* 200. 1 1/2 Hrs. twice daily to 4 April. No additional treatment. Healing complete. Patient sent home.

By 15th April the ulcers had reappeared. They were again treated with *FEL* until 6th May, and again began to heal. 2 months after treatment was stopped, the ulcer on the inside of the leg was completely healed, and the ulcer on the ankle was much diminished in size. The progress of this case up until the untimely stoppage of the treatment and subsequently upon resumption, clearly demonstrates the effect of very low power electromagnetic waves on conditions which are normally very difficult to heal.

## Applications in skin diseases and venous conditions

### 1. DERMO-HYPODERMITES

— Ber. Female. Aged 39. Period of complaint 1 year. Treatment by *FEL 200*: Month 1: 1 hr. 5 times weekly; month 2: 1 hr 3 times weekly.

Results: Complete disappearance of the complaint and of hypodermite infiltration.

— Ost. Female. Aged 50. Period of complaint: 18 months. Treatment by *FEL 200*; 2 months: 1 hr. 3 times weekly.

Results: Satisfactory amelioration, disappearance of eczema and subjective complaints.

— Lib. Female. Aged 57. period of complaint: 2 years. Treatment by *FEL 200*: 1 hr. 3 times weekly.

Results: as early as the tenth session, the pain disappeared and there was noticeable regression of cutaneous erythema.

The change in the hardness of the tissues will be demonstrated by Tonometry: a novel technique developed by one of us, which measures the hardness of the tissues in millimetres of penetration. The more pliable the tissue, the higher the number of millimetres.

The measurements were taken at two peripheral points of the hypodermite area (1 and 3) and at a central point (2).

The first two cases could not be tested by the Tonometer at its present stage of design.

|              | 1   | 2   | 3   |
|--------------|-----|-----|-----|
| 12/5         | 2,2 | 0,7 | 2,1 |
| 25/5         | 3,0 | 1,9 | 2,1 |
| 4/7          | 3,3 | 3,5 | 3,4 |
| Healthy side | 5,8 | 6,0 | 6,2 |

The cases tested had oedema adjacent to the test area, which regressed during the treatment affecting the depth measurements made with a Tonometer having an excessively large sensor. This failed to separate the penetration reduction caused by regression of the oedema and the increase in penetration caused by the softening of the hypodermic infiltrate.

### 2. VARICOSE AND ARTERIAL ULCERS

Three cases of varicose ulcers reacted successfully to *FEL* treatment, as did two other cases of arterial ulcers. The changes were comparable to those described in respect of the first case. The treatment did not succeed with two patients having ulcers in the lower limbs affected with arteritis. Both were habitual smokers and alcoholics. Nevertheless the general stage of health of the two patients improved, which is essential to the success of any therapy in this sphere.

### 3. PRESSURE SORES

Several pressure sores were treated successfully despite a bedridden or worsening general state of the patients.

### 4. ECZEMA

Five cases of eczema which did not respond to local applications of corticoids, showed a clear improvement after treatment with a *FEL 200*. The worst case is cited below.

— Van B. Female. Aged 48. Collagen Disease starting 18 months earlier, onset every four days.

Treatment by *FEL 200*: Month 1: 1 hr 3 times weekly, thereafter 2 hrs. daily.

Results: in three and a half months, the patient suffered no more than 4 relapses of which the most substantial occurred when the antenna was not transmitting for a week. Faster healing of skin cracks.

## Orthopaedic conditions and recent injuries

Following an accident by one of us (crushing of a phalanx in a car door, with complete transverse nail fracture), we were able to observe that immediate treatment with the *FEL* apparatus quickly prevented the development of inflammation and pain. Despite the extent and location of the injury, all pain had gone only five minutes after starting the treatment. The finger did not increase in size and the usual haematoma did not form in the nail bed. Another case, a relatively severe bilateral ankle sprain, responded rapidly to the treatment given three hours after the injury occurred. The substantial oedema which appeared locally, regressed in a few days (objective measurements taken with the Tonometer).

The pain disappeared one quarter of an hour after commencement of the treatment, and on the morning following the injury, the patient did not experience the usual painful loosening-up.

These last two observations led us to treat, post-operatively, cases of hallux valgus immediately after emergence of the patients from the operating theatre. As is well known, pain, oedema and difficulties in healing are common post-operative consequences of hallux valgus surgery.

— Ving. Male. Aged 26. Open tibia and fibula fracture with considerable soft tissue loss and gas gangrene.

*FEL* treatment; 6 hours daily.

Following a substantial improvement and evidence of healing, the surgeon applied grafts which took perfectly.



25 March — Ving. Prior to start of *FEL* treatment.



24 June — Ving. Complete healing of wounds after 13 weeks of treatment, satisfactory bone calcification, and walking without a plaster cast.

Several complex tibia-fibula fractures, with osteosynthesis materials, were treated and the results were sometimes sensational, as in the case described above, which had been transferred to one of our centres for an amputation.

More than 30 similar cases were actually observed in two different centres, and all progressed in an outstandingly similar manner. A substantial improvement was obtained as compared to conventional therapies. To be on the safe side, the patients were given a pain-killing injection on the first night, but no other medication had to be prescribed during the remainder of hospitalisation.

On the whole, the healing of all these cases occurred twice as quickly as normal.

#### Rheumatic conditions

Two acute manifestations of cervical arthrosis and one recurrent lumbar sciatica both treated daily with the *FEL* apparatus appear to have responded more rapidly than in the case of earlier onsets treated by conventional therapies. The absence of an objective factor or of a comparative series of tests induces us however to await the results of further tests before we came to any conclusions on the effectiveness of very low-power Hertzian waves.

Nevertheless, our observations on the improvements achieved in the condition of the hands of two cases of scleroderma and of one chronic rheumatic arthritis lead us to believe that the *FEL* apparatus will prove its value in the future for rheumatic conditions.

Whilst placing an antenna under the palmar surface of a hand, we intercepted a signal transmitted to the back of this hand, which demonstrates the depth of wave penetration and opens up the possibility of treating relatively deep joints.

#### An attempt to interpret the clinical results

In order to have the desired effect most therapeutic agents, be they medical or physical, must be applied in precise dosages, below which they are inactive and above which they rapidly become harmful. As a rule, the margin of utility and safety of these agents is narrow which frequently renders it risky to prescribe them. Many years of application of pulsed, athermic high-frequency electro-magnetic waves has not established evidence of overdosing or of obvious side effects.

After intensive application for six months, we have reached the same conclusions for the *FEL* apparatus. This could be explained by a direct restoration of a valid energy level within the cell. In accordance with a model analogous to rechargeable nickel-cadmium batteries, which once they are recharged, may remain connected to the charger for several days, without damage.

The theories put forward by M. Fellus make it possible to interpret these observations.

\* The organism consists mainly of large protein molecules. Amongst other characteristics these protein macromolecules are electrically charged in the manner of a dipole and behave like elementary magnets.

\* When protein molecules in suspension in a liquid are exposed to a non-coagulating electromagnetic UHF field, they form molecule strings extending along the lines of force of the field, in the manner of iron filings.

\* The electromagnetic field causes the bi-polar macromolecules to assume a micrometric rotation. The molecules return to their initial arrangement when the electromagnetic field is cut off.

\* The macromolecules are not however wholly free in their displacements, but are linked to each other via their opposed poles in accordance with a spatial layout which is particular to the structure in question.

\* Thus organised, the proteins act like liquid crystals and in their totality form electrets. These crystals transform a physical change (mechanical, thermal or magnetic) into an elec-

tronic displacement. Thus, they react to any magnetic variation by a ferro-electric action.

\* The electrets, acting like liquid crystals, have the astonishing property that within their intrinsic mass, they store electric charges generated under the action of physical stress, and these charges increase their level of polarisation.

By way of example, beeswax forms an excellent electret. Upon being rubbed, it allows negative electrical charges to appear at the surface. But contrary to the substances commonly known as having this property, such as bakelite, if the surface charges are removed, for example by moving a finger across the surface, other charges originating from the very mass of the wax immediately appear on the surface.

All animal tissues, excepting tooth enamel, and most vegetable tissues, form electrets. Consequently, when exposed to a varying electromagnetic field, of a precise and non-coagulating nature, the protein molecules are polarised to a high degree and form a store of energy which may serve the purpose of repolarising the cellular membranes injured by any organic or mechanical attack. The normal cell metabolism is accelerated within the ambit of homoeostatic balance.

#### Conclusion

The French physicist, M. Fellus has caused physiotherapy as a whole to be reconsidered by virtue of his work based, on the one hand, on fundamental theories little known to doctors, and on the other hand, in view of recent advances made in electronic miniaturisation. The first apparatus the *FEL* which was recently developed, transmits pulsed 11 metre Hertzian Waves, of very low power, to the area to be treated. For this purpose a flexible antenna is used which is in close contact with and conforms to the area concerned.

Following a series of observations which we published in 1975, high-frequency electromagnetic waves were the physical agent which was most prescribed by us because of its capability of action and of the great variety of its indications. At the beginning of this year, Mr. Fellus requested us to undertake the first clinical observations made with his apparatus. The unexpected and frequently exceptional results were obtained in fields as diverse as:

— Tissue repair, injury, surgery, orthopaedics, skin diseases and vascular conditions.

— Inflammation and oedema.

— Pain.

— Allergy.

No contra-indication or side-effect has been detected to this day.

The *FEL* has the conventional properties of the athermally pulsed high frequency electromagnetic wave transmitters: it has many therapeutic indications and an absence of undesirable effects. It is characterised by its miniaturisation and its low purchase price. We believe that its introduction will cause a significant evolution in medical therapy and an expanded scope for physical medicine.

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