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Treatment with Interferential Current

Foreword by Jeanne-Marie Ganne

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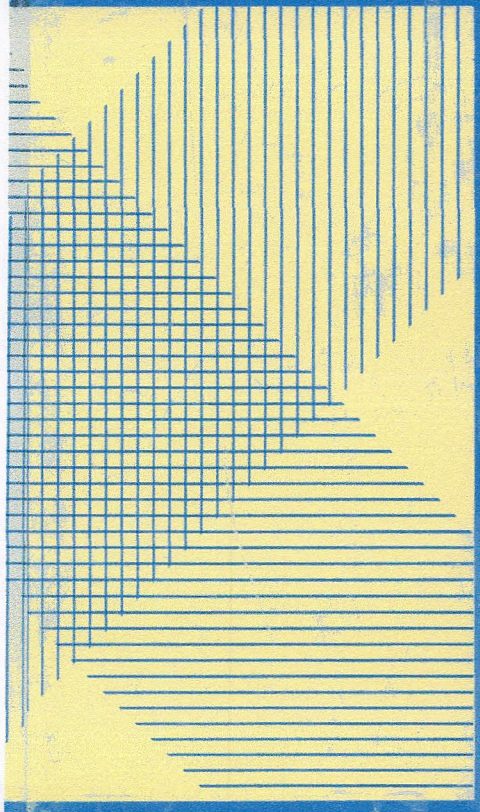

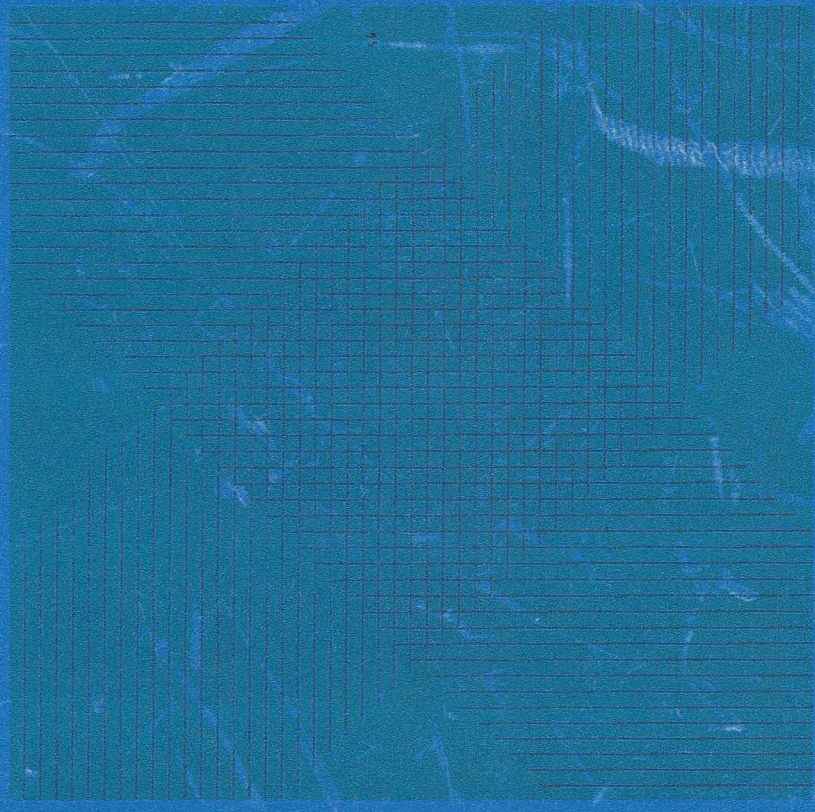

TREATMENT WITH INTERFERENTIAL CURRENT

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Churchill Livingstone
EDINBURGH LONDON MELBOURNE AND NEW YORK 1987

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Gynaecological diseases

ADNEXITIS

Physiotherapeutic methods play an important role in the treatment of inflammatory diseases of the female reproductive organs. Interferential therapy in treating subacute and chronic adnexitis was proposed by Leeb (1955). He observed positive results even in cases where other physiotherapeutic means proved insufficient, but he did not report data on the effect of IC on patients with primary and secondary sterility.[1]

Sterility

Despite progress in the last few years in treating non-specific pelvic inflammatory disease, the problem of the successful treatment of sterility in women has not yet been solved. The development and introduction of new effective therapeutic methods are tasks of the utmost importance. Having successfully applied IT in adnexitis and parametritis between 1963 and 1965 (Nikolova, 1971a), the author undertook a study on the application of IC in women with adnexal, i.e. tubal sterility. Interferential current was applied either separately, or in combination with microwaves, or alternating with US.

The reasoning behind this approach was that IC, at a constant frequency of 100 Hz and a

[1] de Bisschop (1962) applied IC on experimental animals during pregnancy and did not find any harmful influence on the fetus. However, as was noted earlier, we feel that it is not advisable to apply IC in the abdominal and pelvic regions during pregnancy.

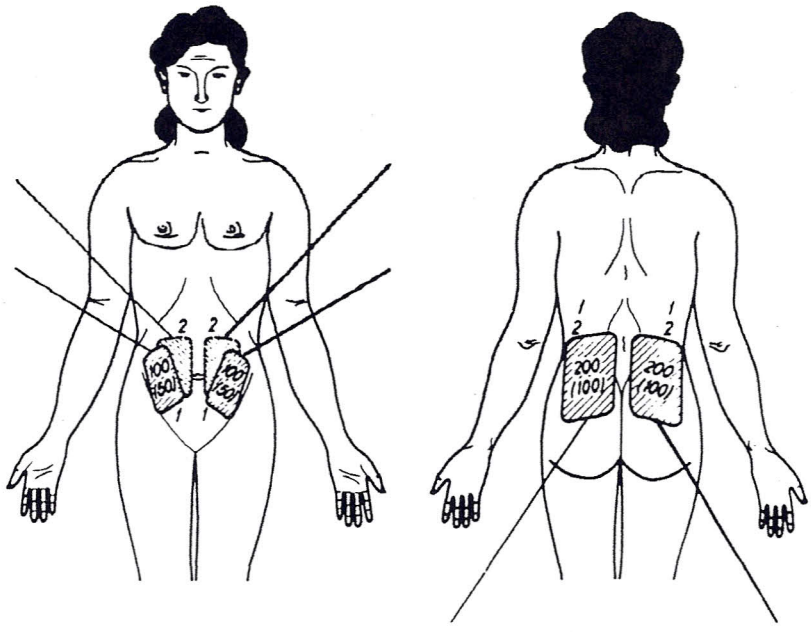


Fig. 4.1 Position of electrodes in treating bilateral adnexitis.

rhythmical frequency of 0–100 Hz, has analgesic and vasodilating effects. It also allows the rapid elimination of toxic metabolic products and ensures better oxygen supply to tissues. In addition it changes the pH to the alkaline side and helps to disperse infiltrations and adhesions. Therefore when combined with US or microwave therapy, IC might be expected to enhance their therapeutic effects.

Interferential therapy was applied with 4-plate electrodes, two of 200 cm^2 and two of 100 cm^2, placed as shown in Figure 4.1. A constant frequency of 100 Hz was used in the first 3 treatments, followed by a rhythmical frequency of 0–100 Hz, the dosage being from 12 to 25 mA depending on the individual tolerance of the patient. The duration of each of the 15 to 20 treatments was 15 to 20 minutes daily or every other day, alternating with microwave therapy.[2]

Microwave therapy through sand was carried out as follows: a round pad with clean, washed sea sand (diameter of the pad 10 to 15 cm, 2 cm thick) was placed first over the left and then the right ovary and Fallopian tube areas; the round transducer of the apparatus (for example Radarmed) was in tight contact with the sand pad; the dosage was slightly thermal, and lasted for 6 to 12 minutes daily or every other day, alternating with IC, for a total of 15 treatments. Ultrasound therapy was preceded by IT (see above), US being applied at a dosage of 0.2–0.4 W/cm^2 for 5 to 6 minutes first on the left and then the right side, for a total of 10 to 12 treatments. A GDR Sonostat therapy unit was used.

Our systematic observations included a total of 170 women with sterility due to chronic inflammatory changes in the adnexa (Table 4.1) who

[2] Treatment can also be carried out with two vacuum electrodes placed ventrally and 2-plate electrodes dorsally.

Table 4.1 Gynaecological condition causing sterility

Type of sterility	Number of patients
Primary sterility	
with bilateral adnexal changes	79
with unilateral adnexal changes	6
with adnexitis and parametritis	4
Secondary sterility	
with bilateral adnexal changes	61
with unilateral adnexal changes	17
with adnexitis and parametritis	3

Table 4.2 Age distribution of patients with sterility

Age (in years)	Number of patients	Conception after treatment
20–25	30	4(13%)
26–30	80	15(19%)
31–35	35	7(20%)
36–41	25	4(16%)

Table 4.3 Duration of sterility

Duration of sterility and previous treatment	Number of patients	Conception after treatment
0–3 years	60	12
3–5 years	44	7
6–10 years	45	7
over 10 years	21	4

had been given out-patient treatment.[3] Before admission the patients had been treated by means of drugs, mud-baths or paraffin applications, KI or $CaCl_2$ electrophoresis, tubs, vaginal irrigations or hydrotubes, but without effect. The age of the patients is given in Table 4.2, the duration of sterility and preliminary treatment in Table 4.3, and the method applied in Table 4.4.

[3] Patients were from the sterility consulting clinic at the Faculty of Medicine and the second City Hospital in Sofia, Clinic of Obstetrics and Gynecology.

The therapeutic effect was assessed on the basis of the following indices: subjective complaints, gynaecological condition, blood picture with differential count, sedimentation rate of the erythrocytes, transaminases SGOT and SGPT, plasma protein and protein fractions, 17-ketosteroids, basal temperature, hysterosalpingography (before and after treatment in 75 patients) and kymographic insufflation (before and after treatment in 65 patients).

All the patients felt that the treatment had a pleasant sensation. Treatment of pain was most favourably influenced with it starting to diminish after the first 5 to 6 treatments. Out of 122 women admitted with pelvic pain and heaviness, the pain completely disappeared in 108 women and diminished in 14 by the end of the treatment.

Other clinical investigations before and after treatment did not show any deviation from the norm with the exception of the erythrocyte sedimentation rate, which was slightly raised in 20 patients before treatment and became normal in all patients after treatment. These data are indicative of a chronic stabilised process on the one hand, and give reason on the other hand to believe that the four methods used do not produce side effects at those given dosages.

The investigation of *basal temperature* before and after treatment with the above four methods

Table 4.4 Response of gynaecological condition to treatment*

Applied therapeutic method	Number of patients	Gynaecological condition		
		Normalised or improved	No change	Conception
Interferential current	82	43(52%)	39(48%)	13(16%)
Interferential current combined with microwaves	53	31(59%)	22(41%)	14(26%)
Microwaves	10	2(20%)	8(80%)	1(10%)
Interferential current alternating with ultrasound	25	24(56%)	11(44%)	2(8%)

* Gynaecological changes on palpation were demonstrated in a number of patients. For instance, in a patient treated with IC a lump as big as a hen's egg completely disappeared, and the erythrocyte sedimentation rate in the same patient improved from 38/50 (after Westergreen) to 6 mm (after Panchenko). In 2 patients treated with IC combined with microwaves, lumps as big as a hen's egg and a medium-sized orange completely disappeared, and the accelerated erythrocyte sedimentation rate in one of them having improved from 25/45 to 3/9

did not show a harmful effect on ovarian function. (This was the first time that the effect of IC on ovarian function was established.) On the contrary, biphasic cycles were observed after treatment (Figs 4.2, 4.3 and 4.4). This is also in complete agreement with the histochemical and electronic microscopic investigations on the influence of microwaves (Nikolova & Ramadanov, 1977; Nikolova & Takeva, 1980).

Gynaecological examination after completion of treatment showed improvement in the gynaecological condition of patients treated with IC, as

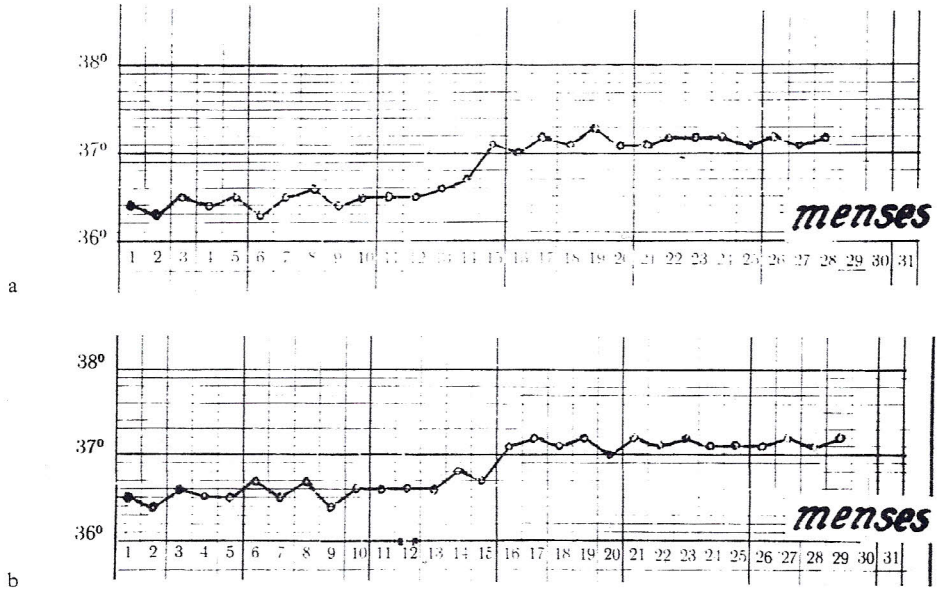


Fig. 4.2 Basal temperature. a. Before IC treatment. b. After treatment.

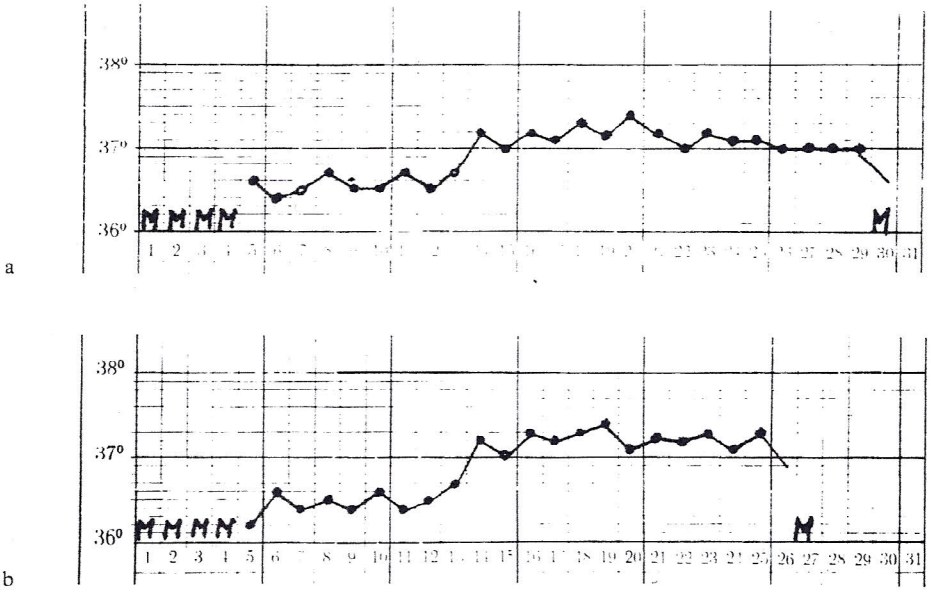


Fig. 4.3 Basal temperature. a. Before microwave treatment. b. After treatment.

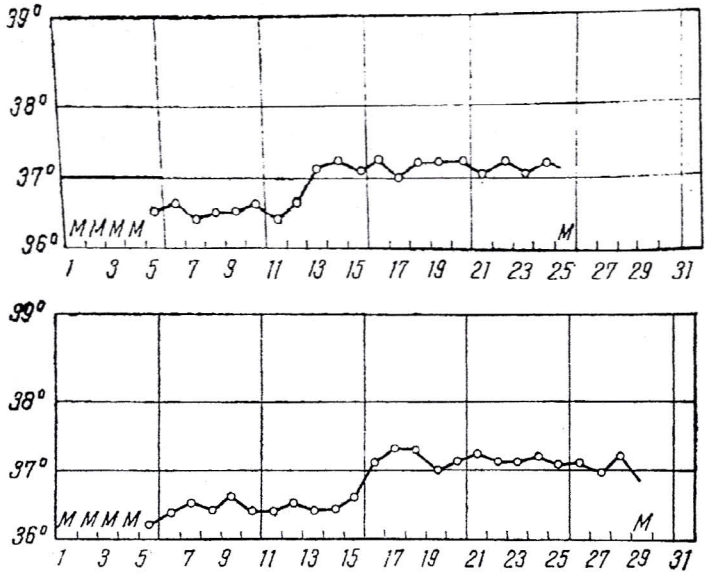


Fig. 4.4 Basal temperature. a. Before treatment with IC and microwaves. b. After treatment.

well as in those who had IC combined with microwaves (Table 4.4).[4] The same applied to the percentage of pregnant women with respect to the total number of women under treatment (Table 4.4). These data show certain advantages of the combined method, which can be accounted for by the mutually enhanced effects of the two factors — analgesia and improved blood circulation and metabolic processes. Bearing in mind that a considerable decrease of blood supply to this area was found by rheography, namely in inflammatory processes in the true pelvis, we consider that the convincing therapeutic effect is primarily due to improved blood circulation and metabolic processes under the influence of interferential and microwave therapy. The more marked effect of IT compared with that of microwaves (in isolated application) is accounted for by the greatly improved microcirculation and local metabolic processes (Nikolova & Davidov, 1978).

A normalised or improved gynaecological condition was also found by control hysterosalpingography and kymographic insufflations (Figs 4.5, 4.6 and 4.7). For instance, from the group treated with IC in conjunction with microwaves, open tubes as far as the ampulla were found by control hysterosalpingography in a woman with obstructed tubes in the interstitium itself; in two other women with bilateral obstruction, diagnosed by insufflation and hysterosalpingography, the control insufflation showed bilateral patency.

Conception was usually found to occur within the first 3 months, the results being significantly better in secondary sterility (Nikolova & Ramadanov, 1977), as shown in Figure 4.8 and Tables 4.5 and 4.6, but without a statistically significant difference ($p > 0.05$).

The following examples illustrate the therapeutic effect of the treatment:

> A 34-year-old patient was admitted with a diagnosis of chronic bilateral adnexitis, secondary sterility. After an induced abortion in the 6th lunar month she had not conceived for six years. Treatment for sterility had been

[4] Our results were confirmed later by Haag (1979), who recommends that treatment for adnexitis should be carried out with four vacuum suction electrodes at a rhythmical frequency of 0–100 Hz. Treatment in parametropathy is provided with four vacuum suction electrodes at a frequency of 90–100 Hz. He also relates his experience with intrauterine devices (IUDs). In recent years a large number of patients of different ages have been fitted with IUDs. Most patients experienced no discomfort, either at the time of fitting or later. Some patients, however, suffered from acute pain in the whole lower part of the abdomen. These patients were also treated at frequency range III with four suction electrodes. The front pair of electrodes was placed as low as possible in the groin, while the rear pair was positioned in the region of the kidneys.

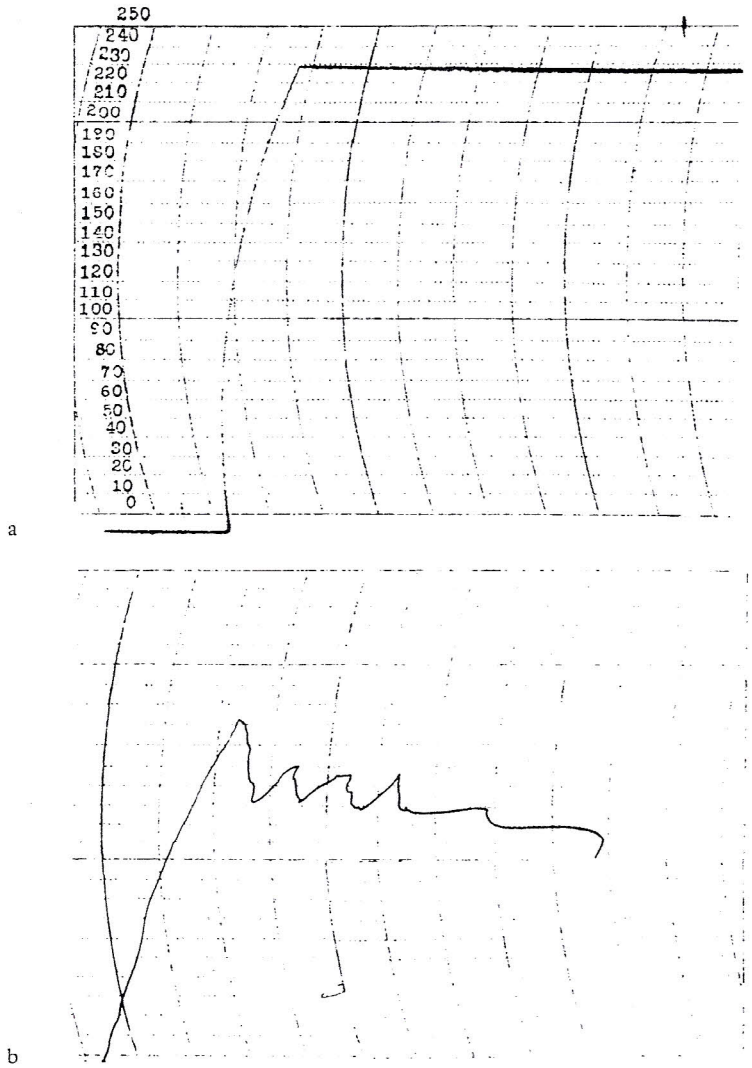


Fig. 4.5 Kymographic insufflation. a. Before IC treatment. b. After treatment.

carried out without effect. Two months after completion of IT she became pregnant, no other treatment being applied during that period.[5]

A 23-year-old patient was admitted with a diagnosis of chronic bilateral adnexitis, primary sterility. For five years she had had primary sterility. Kymographic insufflation showed bilateral obstruction. After completion of IT she immediately became pregnant.

A 29-year-old patient was admitted with a diagnosis of chronic bilateral adnexitis, secondary sterility. For seven years she had not been able to conceive, in spite of the treatment provided. Kymographic insufflation before treatment showed bilateral obstruction. Interferential therapy led to immediate conception.

A 33-year-old patient was admitted with a diagnosis of chronic bilateral adnexitis, and she had recently been operated on for a retroverted uterus. She had been married for 12 years and had one child who had died. Since 1964 she had been trying to become pregnant, and she had been treated for years for sterility. She conceived immediately after the completion of IT combined with microwave therapy.

[5] It is necessary to bear in mind that 2–3 therapeutic courses are often required to obtain the desirable effect (i.e. conception and normalisation of the gynaecological condition).

The following conclusions can be drawn from the above observations:

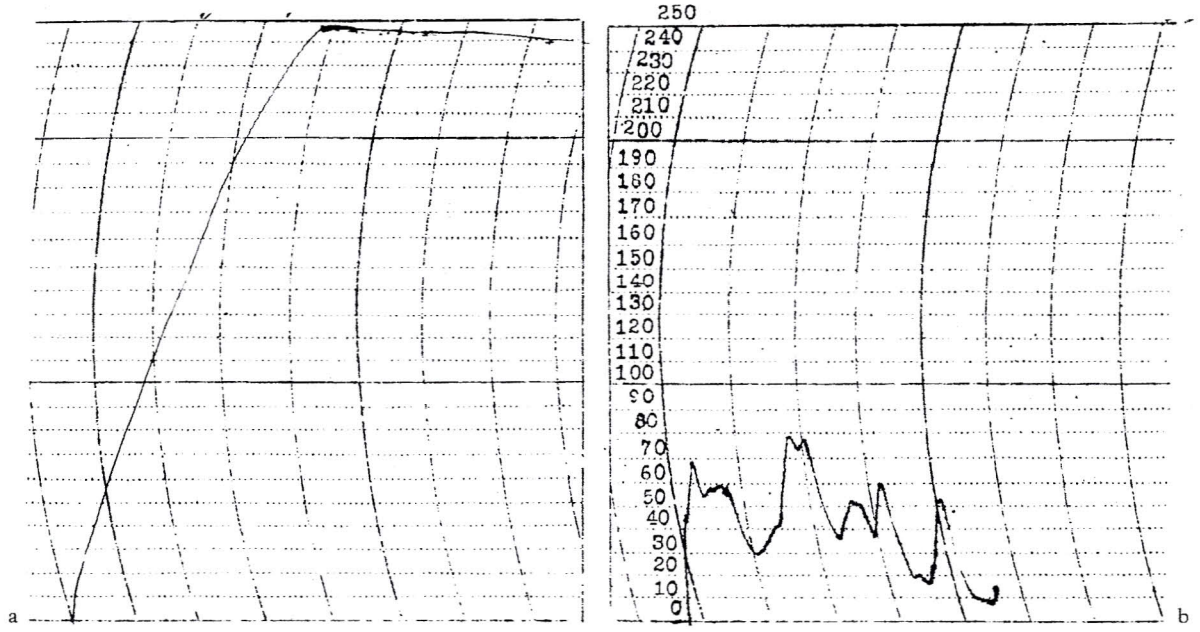


Fig. 4.6 Kymographic insufflation. a. Before treatment, the kymographic insufflation showed bilateral obstruction of the tubes. b. After IT combined with microwaves — normal patency of tubes.

Table 4.5 Conception after completed treatment related to length of time

Conception after completed treatment	Number of pregnant women	Conception percentage depending on time since treatment
Up to 3 months	23	77%
From 3 months to 1 year	6	20%
More than a year	1	3%

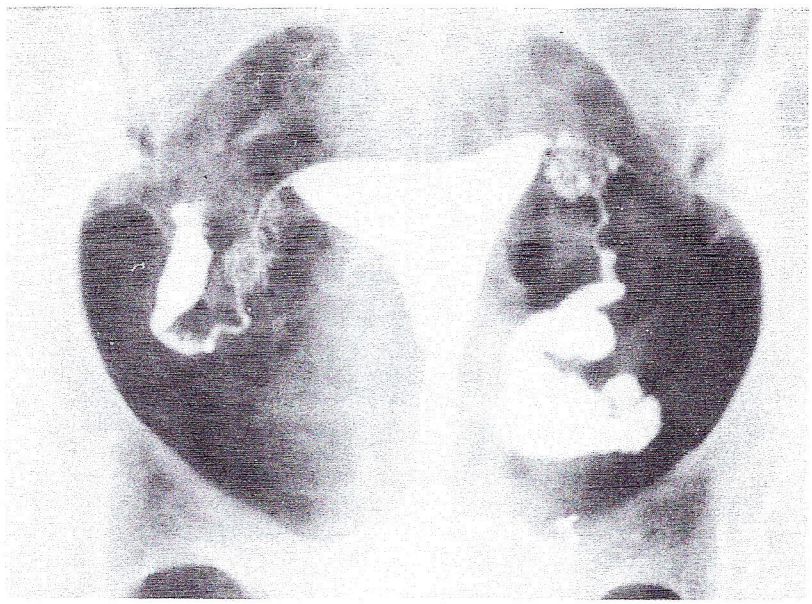
Table 4.6 Conception after treatment related to type of sterility

Type of sterility	Number of patients	Conception
Primary sterility	92	12(13%)
Secondary sterility	78	18(23%)

1. Interferential current applied in isolation or in conjunction with microwaves helps both to relieve subjective complaints, such as pain, and to remove or reduce inflammatory adhesions in female reproductive organs. Similar clinical results are also obtained from the application of IC alternating with ultrasound, but a lower percentage of conceptions is reported.
2. The anatomical and biological results obtained from IT and the application of IC alternating with microwaves should recommend the wide introduction of these two methods in the treatment of primary and secondary sterility due to specific inflammatory conditions of the reproductive organs.

AMENORRHOEA AND DYSMENORRHOEA

According to Leeb (1955) IT gives good results in the treatment of amenorrhoea and dysmenor-



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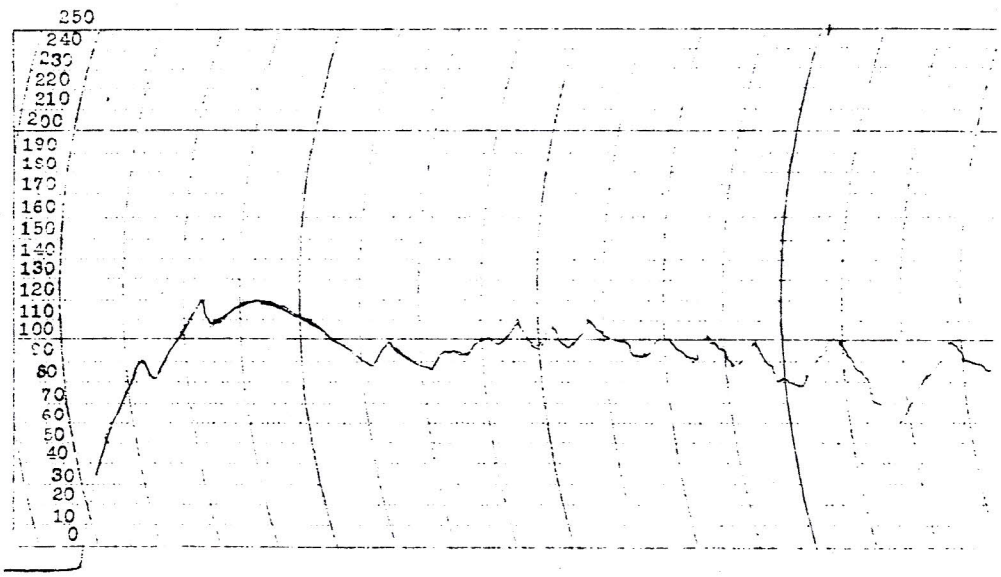

b

Fig. 4.7 a. The hysterosalpingography before treatment showed bilateral patency of the tubes to the ampullar parts, which are enlarged as in hydrosalpinx. b. After IT combined with microwaves the kymographic insufflation showed opening of the ampullar parts and bilateral permeability.

rhoea, which is also confirmed by the author's personal observations. It is applied in the same manner as for adnexitis at a rhythmical frequency of 90–100 Hz. Some courses in sequence are needed.

PARAMETRITIS

Interferential therapy is applied in chronic parametritis, using the same methods as in adnexitis. It fundamentally improves the gynaecological

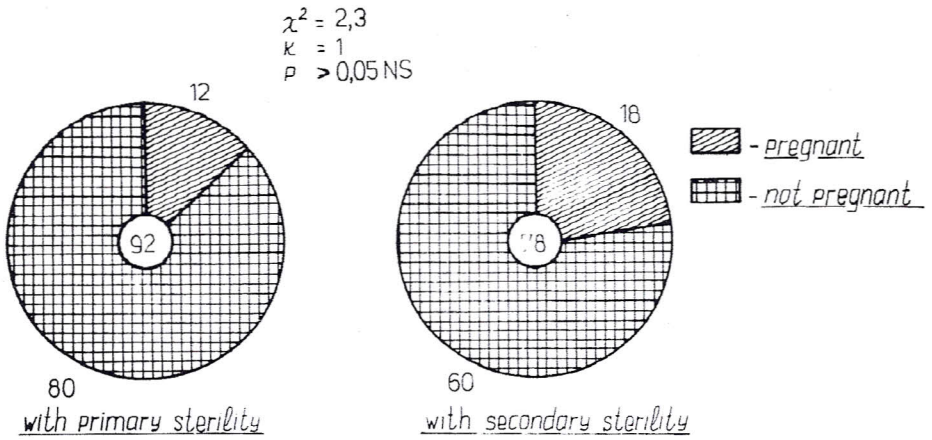

Fig. 4.8 Results of applied therapy using IT in primary and secondary sterility.

condition. The observations of Strougatskij & Kononova (1968) are similar to ours. They observed both relief of pain and essential reduction of adhesions in patients with chronic inflammatory processes in the true pelvis.[6] Further they proved by rheography that IT favourably influences blood flow in the true pelvis, and that this plays a substantial part in the process of healing.

STRESS INCONTINENCE

Interferential therapy for the treatment of stress incontinence in female patients gives good results. It can be applied in the following three ways:

1. Two-plate electrodes, 100 cm^2 in size, are placed paravertebrally low in the lumbar area, and the other two, 50 cm^2 in size, on the inguinal folds. Six to 10 to 15 treatments are applied for 10 minutes daily at a rhythmical frequency of 0–100 Hz and 0–10 Hz.
2. Treatment is applied as for nocturnal enuresis (Fig. 3.2). Paunova (1972) claims that the patients benefited more from this type of treatment. When urination is disturbed after parturition, treatment is started 2 to 3 weeks later, and in surgical patients, after removal of the Nélaton catheter.
3. Two vacuum suction electrodes are positioned on both sides of the abdomen, and the other two on the upper inner side of the thighs (Fig. 4.9). A rhythmical frequency of 0–100 Hz is applied for 8 to 18 minutes for 10 treatments altogether.

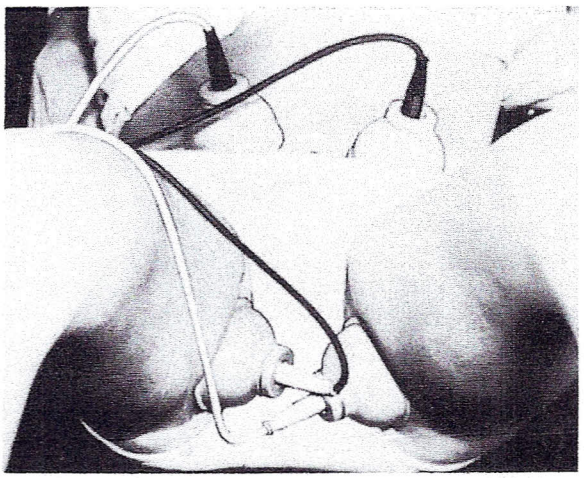

Fig. 4.9 Position of vacuum electrodes in stress incontinence (after McQuire).

[6] Burghart reported removal of adhesions by means of IC as early as 1952, and Leeb (1955) noted the favourable effect of interferential therapy in adhesions after hysterectomy, where other methods had failed. It is also confirmed by our observations. The treatment is provided with plate electrodes at rhythmical frequencies of 0–10 and 0–100 Hz, positioned according to the localisation of the adhesions, administered daily for 12 to 15 minutes (with suction electrodes, for 6 to 8 minutes), for a total of 15 treatments. Better results are achieved in combination with appropriate thermotherapy.

The following method has been proposed by McQuire (1975), who has greatly contributed to the use of IT for the treatment of stress incontinence in combination with vacuum massage. He recommends an IC of 25–30 mA (mostly 30 mA), 15 pulses at peak, 0.25 to 0.30 kP per cm^2 (mostly 0.3 kP/cm^2). The duration of the first treatment is 10 minutes; if no unpleasant sensations such as bleeding or backache are experienced, treatment duration can be increased to 15 minutes.

McQuire also combines IT with exercise therapy, stressing that it is necessary to explain its importance to the patient in order to achieve a good therapeutic effect.

It should be noted that IT using the above three methods is not given during menstruation.

Leuthäusel & Rugendorff (1978) applied IT in 43 men with autonomic urogenital complaints but with no clinical symptoms in the urogenital area. They claimed that IT was more suitable than pharmacological treatment. A current of 90–100 Hz frequency was applied in the area of dermatomes T_{10}–L_1. The patients experienced a pleasant sensation with no side effects and the therapy was technically easy to apply. Treatment was given twice a week and the current intensity was selected according to the patient's tolerance.