

Computerized Interferential Therapy

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ABSTRACT

The following proposed project is about modified type of Interference Therapy which we are going to introduce now. Since now days in Health and Research sector, various type of instrument is being used. Interferential Therapy (IFT) is one of the physical therapy and the mid-frequency electrical signal to treat muscular strains and spasms. The current produces a massaging effect in the affected area at periodic intervals, and it stimulates the secretion of endorphins, the natural pain relievers, thus relaxing strained muscles and promoting soft-tissue healing. Its use is contraindicated if the affected area has wounds, cuts or infections. The principle of IFT is to use physiological effects of low frequency at <250 pps electrical stimulation of nerves without the associated pain and side effects associated with low-frequency stimulation.

KEY WORDS: Computerized, IFT.

1. INTRODUCTION

IFT works in a unique principle because it is interferential as opposed to normal stimulation. The drawback special effect is lacking, and most likely that IFT is another means of stimulating peripheral nerves. It is rather a generic means of stimulation. The machine can be set up to act more like a TENS-type device or a muscle stimulator by adjusting the stimulating (beat) frequency. Patients regard it as more acceptable, as it generates less discomfort than some other forms of electrical stimulation.

Some of the clinical application of IFT is Relieve pain, Stimulate muscles, Increase local blood flow, Reduce edema.

Proponents make additional claims for its role in stimulating healing and repair, and for various specialized application, such as stress and incontinence.

As IFT acts primarily on the excitable (nerve) tissues, the strongest effects are likely to result from such stimulation, that is, pain relief and muscle stimulation. Other effects are likely to be secondary consequences of these.

Electrotherapy:

Electrical Stimulation: Electricity is a form of energy that displays magnetic, chemical, mechanical, and thermal effects on tissue, implies a flow of electrons between two points; therapeutic electrical generators are transcutaneous electrical stimulators and majority of these generators are used to stimulate peripheral nerves and are correctly called transcutaneous electrical nerve stimulators (TENS).

Occasionally the terms neuromuscular electrical stimulator (NMES) or electrical muscle stimulator (EMS) are used; however, these terms are only appropriate when the electrical current is being used to stimulate muscle directly, as would be the case with denervated muscle in which peripheral nerves are not functioning.

Direct Current and Alternating Current: Flows in one direction only from the positive pole to the negative pole, direct current may be used for pain modulation or muscle contraction or to produce ion movement.

The direction of current flow reverses itself once during each cycle, alternating current may be used for pain modulation or muscle contraction.

Pulsed Current: Pulsed currents usually contain three or more pulses grouped together. These groups of pulses are interrupted for short periods of time and repeat themselves at regular interval. Pulsed currents are used in interferential and the Duration: 10 to 30 minutes it can be used with ice or heat

2. MATERIALS AND METHODS

Electrotherapy frequencies between 1 and 250 Hz, these interference therapy frequencies are generated in the tissue by the superposition of two currents. Due to high frequency of the current intensities the areas deep in the body can be stimulated.

In the interferential therapy two medium frequencies are made alternatively currents. These are not identical and differ in frequency up to 150 Hz and two oscillator of medium frequency are generated and cross wisely applied to the body by means of four electrode pads.

Each channel with one pair of pads, one oscillator has a fixed frequency of 4000 Hz the other one can be ranged in frequency between 3850 Hz. Both oscillator interfere intersect the body resulting in a modulated signal as a carrier and low frequency part for the regular therapy.

These two current are applied to any part of the body at the point where the current each other. The new Beat frequency current set p is amplified which is been modulated. AMF Amplified modulated frequency and the new current is called interferential current which is Hz by varying the constant frequency of the first of it is possible to create any desired frequency rate in carrier currents.

Pole Mode: The maximum AMF is obtained in the intersection of two applied of the alternating currents. Therefore the electrodes should be applied accurately. The balance (CH2) enables minor adjustment of the area of the effective stimulation the four pole method enables selective stimulation of the deeper lying tissue and is highly suitable of shoulder, knee, neck and lower back. In this mode there has to be strictly all of the four pad that is two pads that is of CH1 and CH2.

Pole Vector: In this mode i.e 4 pole vector is selected the 30 sec count down start to set intensity properly in the channel i.e (CH1 & CH 2) in the order not to get jerk to the patient during 4pv as when we increase intensity we are not able to understand the output current a it is varying continuously. As in this one of FH1 o/p remain constant while CH2 is frequency or current start varying .It automatically scan the full area applied. In this mode amplitude varies. But frequency is stable of one channel and vice versa for other channel.

Pole 2 Mode: In this mode the AMF interferential current is generated inside the unit and supplied to the patient through through two electrode. This method make it very easy to localize the area of stimulation because the AMF is present in the region between the two electrodes. It is particularly suitable for the treatment of trigger points muscles and skin zones. In this mode it is not necessary to use all of four pads, but two pads are used i.e pair of pad can be applied individually at any different places at a time.

Beat Frequency & Scan Mode: As here directly beat frequency is produced which is basically difference of base frequency? Which can be varied from 0 Hz to 150 Hz maximum by pressing push button on the front panel and hence the desired frequency can be selected.

Biomedical Significance: One of the most important biomedical significances of EMS is muscle rehabilitation in **response to the sports injuries** of athletes. This comes into play when a limb is immobilized for an extended period of time and requires treatment in order to prevent any type of atrophy or disuse problem. The electrical stimulation provided will force the muscles to undergo contraction and relaxation periods that will help build up the immobilized muscle while additionally strengthening said muscle.

- EMS can also be implemented to help improve blood circulation, which can aid in diminishing localized swelling and sensitivity. This refinement can also assist with the prevention of Venous Thrombosis after surgeries on muscles.¹
- It also becomes necessary to electrically shock the muscles to maintain a normal range of motion. Say an athlete suffers from a fracture in either their shoulders, or knees, and this causes a large reduction in the physiological range of motion; EMS would allow that athlete to at least keep their previous motion range, if not actually to improve it. Another issue many athletes suffer from is painful muscle cramping. These muscle spasms usually take place in areas of isolated tenderness and soreness. The electrical stimulation is then applied to the spasmodic muscle, fatiguing it in such a way that it stops convulsing.

3. RESULTS AND DISCUSSION

Sensitivity analysis of interference current through EMS and T.E.N.S was presented; with the help of relay switch we can select the mode for child and adult. Physical therapy: Computerised interference therapy is used as a physical therapy to treat the muscles strain and spasm. It is mostly used by the physiotherapist to prevent the muscles atrophy for the disabled and those who have been in an accident. Since it has great use in the diseases such as Lumbago, Paralysis, Rheumatoid arthritis of knee etc. Sporting: Our machine also have huge use in the field of sporting, such as many athletes can use it for muscles growth and stimulation of muscles in any sport in it. Unlikely bodybuilder often use it for help in acceleration of muscles repair process after having strenuous work out. Computerised IFT also have wide uses for the older and disabled people to stimulate body parts and to maintain a normal range of motion. Proponents make additional claims for its role in stimulating healing and repair, and for various specialised application, such as stress and incontinence. The mode selector method makes this machine useful for child.

4. CONCLUSION

Electrical Muscle Stimulation has been used frequently over the past half century in both medical and athletic practices, and it has been altered to help advance muscle recovery and growth, as well as to assist in the prevention of muscle atrophy. One of the most important uses of EMS is in the athletic field concerning muscle rehabilitation. While electrical muscle stimulation is not a guaranteed cure for athletic injuries, it is a definite aid to shortening the length of recovery time. This can be seen in multiple medical studies as well as in the opinions of a professional who uses EMS frequently with her student athletes.

In the entire EMS modalities previously mentioned, the signal across the electrodes was a square wave oscillating at different frequencies for various periods of time. This caused the muscle stimulation to be very abrupt and unnatural. Therefore, our way of improving EMS would be to measure a person's own muscle excitation via an EMG and store this signal. Then, when EMS is desired, we could stimulate the muscles with a signal more similar to the person's own signal. This would result in a more natural EMS treatment.

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