MEDIUM FREQUENCY CURRENT INTERFERENTIAL STIMULATION

Aakanksha Bajpai Assistant Professor School Of Health Sciences • Interferential stimulation (IFS) units generate two ACs on two separate channels. One channel produces a constant high-frequency sine wave (4000 to 5000 Hz), and the other channel produces a sine wave with a variable frequency.

• The two currents meet in the body to produce an interference wave having a frequency of 1 to 299 Hz.

• The medium frequency carrier currents penetrate the tissues with very little resistance.

• The resulting interference currents are in a range that allows effective stimulation of deeper tissues than other forms of electrical stimulation with relatively little patient discomfort.

Box 13-5. ELECTRICAL INTERFERENCE



Constructive Interference

When two electrical currents are in perfect phase-that is, the wavelengths are equal and the phases cross the baseline at the same pointthe amplitude of the combined wave is equal to the sum of its two parts.





Destructive Interference

Two currents are perfectly out of phase. The positive peak of the first waveform occurs at the same point on the horizontal baseline as the negative peak of the second wave. When these two waves meet, the amplitudes cancel each other out, resulting in a wave intensity of zero.

Continuous Interference

When two currents have slightly different frequencies (e.g., plus or minus 1 Hz), the resulting wave alternates between constructive and destructive interference.

Electrode Placement

• When an alternating current is used the electrodes should be no more than 5.9 inches (15 cm) apart.

Quadripolar Technique

- The four electrodes are positioned around the painful area so that each channel runs perpendicular to the other and the current crosses at the midpoint .
- The interference effects branch off at 45-degree angles from the center of the treatment, in the shape of a four-leaf clover.

• Tissues within this area receive the maximal treatment effect; however, the distribution of the current is inconsistent, potentially leading to discomfort and decreased treatment effectiveness.

• When the electrodes are properly positioned, the stimulation should be felt only between the electrodes, not under the electrodes.



Figure 13-5. Interference Pattern. Maximal benefit from interferential stimulation occurs at 45-degree angles from the intersection of the channels.

INSTRUMENTATION

• **Power:** When the switch is in its ON position, the current is allowed to flow to the internal components of the generator.

• **Reset:** This safety feature ensures that the intensity is reduced to zero before the treatment is started.

• **Timer:** This control sets the duration of the treatment and subsequently displays the remaining time. On some units, the TIMER serves as the master power switch.

• Start-stop: This switch is used to initiate and terminate the treatment.

• Intensity: This control adjusts the amplitude of the pulse and is displayed in milliamperes (mA). When quadripolar stimulation is used, the intensity control regulates both channels simultaneously or each channel may be individually adjustable.

• **Mode:** This switch allows the user to choose between true interferential therapy and bipolar stimulation. The interferential mode allows the current to stimulate deep tissue.

In the bipolar mode, only one channel is used, and the resultant current flow stimulates relatively subcutaneous nerves.

• **Premodulated/Russian stimulation:** This mode changes the output from amplitude-modulated to burst-modulated for evoking strong muscle contractions. This technique may use one or both channels.

• **Beat frequency:** The "beat" is the result of the fixed rate of the carrier wave and the variable rate of the second channel causing changes in the amplitude of the applied current.

• **On-off control (duty cycle):** When Russian-type stimulation has been selected from the MODE control, this adjusts the duty cycle by determining the amount of time the current is ON versus OFF.

• **Ramp:** Allows the user to determine the amplitude rise time until the peak current is obtained. Often the RAMP represents the percentage of the ON duty cycle time required to reach the maximum intensity. • **Balance:** This dial allows the user to control the balance of electrical current under each set of electrodes and to equalize the sensory stimulation. It may only be meaningful during quadripolar stimulation.

SETUP AND APPLICATION

- Initiation of the Treatment
- ✓ Turn on the unit by activating the POWER switch.

 Reset parameters: Fully reduce the INTENSITY control and depress the RESET button.

 Select application mode: Determine the MODE of application: quadripolar, bipolar, or Russian stimulation.

 Adjust beat frequency: Select the appropriate BEAT frequencies based on the goals of the treatment. Adjust sweep frequency: Use the appropriate SWEEP frequency for this treatment protocol.

Adjust treatment duration: Set the duration of the treatment by adjusting the TIMER.

 Begin treatment: Press the START button to close the circuit between the generator and the patient's tissues.

Increase output intensity: Slowly increase the INTENSITY control until the appropriate current level is obtained.

✓ Adjust balance: If necessary, adjust the BALANCE control to obtain maximal treatment comfort.

TREATMENT DURATION

• Interferential stimulation may be applied once or twice daily in treatment bouts normally ranging from 15 to 30 minutes.

INDICATIONS

- Acute pain
- Chronic pain
- Muscle spasm
- Oedema
- Hematoma
- Chronic ligamentous lesion
- Trigger spot
- Stress incontinence
- Delayed union

CONTRAINDICATIONS

- Cardiac disability
- Demand-type pacemakers
- Arterial disease Uncontrolled hemorrhage Sites of infection
- Blood clots
- Pregnancy
- Cancerous lesions Exposed metal implants History of seizures
- Sensory or mental impairment Unstable fractures

PRECAUTIONS

• Improper use can result in electrode burns or skin irritation.

• Intense or prolonged stimulation may result in muscle spasm and/or muscle soreness.

REFERENCE

• Therapeutic modalities. Chad starkey.Fourth edition.

THANK YOU