Interferential Therapy

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The Principles of Interferential Therapy Current Production

Current ‘A’ is at 4000Hz, and current ‘B’ is at 3900Hz. Interference current (beat frequency) generated in the central zone at the difference between input currents which would be 100Hz.

Basic Interference Zone
3D Interference Pattern

Action potential

Interferential Sweep Patterns
Interferential Sweep Patterns
Interferential Therapy - Clinical Uses

- Pain Relief
- Decrease Oedema
- Increase Blood Supply
- Muscle Stimulation

Clinical Application

- Stimulate the SENSORY nerves
- stimulate the MOTOR nerves
- use the muscle activity to stimulate local blood flow
- use the muscle activity and increased blood flow to reduce OEDEMA
Interferential Therapy for Pain Relief - Stimulation Parameters

- Aβ fibres → Pain Gate activation → 90 - 130 Hz
- Aδ fibres → Opioid system activation → 2 - 5 Hz

Interferential Therapy Rx Frequencies

- Muscle stimulation → 10 - 25Hz
- Avoid frequencies below 10Hz due to potential sympathetic nerve involvement
- Avoid frequencies over 40Hz (tetanic) due to the potential for further muscle damage

Interferential for increasing local Blood Flow

- No evidence that interferential can directly change local blood flow
- Use the IF to stimulate local tissue metabolism, and use the metabolic change to induce local blood flow changes
- Easiest metabolic change to bring about with IF is that of muscle

Interferential for Oedema Reduction

- No nerve available for direct reduction of oedema
- Instead aim to activate the normal physiological processes: increase blood flow and activate the muscle pump
- Use the IF to stimulate the muscle and hence mimic physiological methods

Stimulation Intensity

- No Sensation
- Definite Sensation
- Painful Sensation
- Maximum Tolerance
Electrode Placement

- Target stimulus at appropriate spinal level
- Either side of lesion
- Over nerve roots
- Over peripheral nerve
- At motor points
- At trigger/acupuncture points
- Dermatome, Myotome, Sclerotome
- If vague or extensive, can try 2 channel

The Analgesic Effects of Different Swing Patterns of Interferential Currents on Cold-induced Pain

Johnson M & Wilson H
Physiotherapy 83(9);461-467

- Single blind placebo controlled study
- Compare effects of 6A6 with 1 sweep patterns for pain relief after cold induced pain in healthy subjects
- Frequencies 90 - 130Hz on 4000Hz carrier 20 min
- Cold pressor test (60 mins)
- 4 pole interferential to forearm (pad electrodes)
- Strong but comfortable sensation
- Result: - Increased pain threshold for 6A6 swing pattern compared with 1 sweep and sham treatment.

A Randomized Clinical Trial of Manipulative Therapy and Interferential Therapy for Acute Low Back Pain

Hurley et al 2004

- STUDY DESIGN: A multicenter assessor-blinded randomized clinical trial was conducted.
- OBJECTIVES: To investigate the difference in effectiveness of manipulative therapy and interferential therapy for patients with acute low back pain when used as sole treatments and in combination.
- SUMMARY OF BACKGROUND DATA: Both manipulative therapy and interferential therapy are commonly used treatments for low back pain. Evidence for the effectiveness of manipulative therapy is available only for the short-term. There is limited evidence for interferential therapy, and no study has investigated the effectiveness of manipulative therapy combined with interferential therapy.

- METHODS: Consenting subjects (n = 240) recruited following referral by physicians to physiotherapy departments in the (government-funded) National Health Service in Northern Ireland were randomly assigned to receive a copy of the Back Book and either manipulative therapy (MT; n = 80), interferential therapy (IFT; n = 80), or a combination of manipulative therapy and interferential therapy (CT; n = 80).

- The primary outcome was a change in functional disability on the Roland Morris Disability Questionnaire. Follow-up questionnaires were posted at discharge and at 6 and 12 months.

- The groups were balanced at baseline for low back pain and demographic characteristics.
- At discharge all interventions significantly reduced functional disability and pain and increased quality of life to the same degree and maintained these improvements at 6 and 12 months.
- No significant differences were found between groups for reported LBP recurrence, work absenteeism, medication consumption, exercise participation, or healthcare use at 12 months.
Hurley et al 2004: Conclusions
For acute low back pain, there was no difference between the effects of a combined manipulative therapy and interferential therapy package and either manipulative therapy or interferential therapy alone.

Hurley et al 2004 IFT settings
- Portable IFT device (Omega Inter 4150)
- Battery powered
- 140Hz constant
- 30 minutes
- 2 self adhesive electrodes
- Paraspinal / nerve root placement
- Minimum of 4 and maximum of 10 treatment sessions over 8 weeks

Quirk et al (1985)
An evaluation of interferential therapy, shortwave diathermy and exercise in the treatment of osteoarthritis of the knee
Physiotherapy 71(2):55-57
- 38 patients with primary OA knee
- Divided into 3 groups
  - Interferential and Exercise
  - Shortwave (continuous) and Exercise
  - Exercise only

Quirk et al 1985 (contd)
- Interferential:
  - 10 mins at 0 – 100Hz sweep
  - Followed by 5 minutes at 130Hz
  - Vacuum application
- Shortwave
  - 20 minutes continuous, condenser field
- Exercise – all patients
  - SLR x30 with 10 sec hold
  - Within pain limits, 2 x daily
  - Add weights progressively plus free active flexion
Quirk et al 1985 (contd)

- Assessed by blinded therapist before and on completion of the programme
- ROM, exercise endurance, max knee girth, pain, function
- RESULTS
  - Significant improvement PAIN scores all 3 groups
  - No difference between groups
  - Both electrotherapy groups showed improved ROM but no change knee girth
  - All patients remained improved at follow up
  - Electro treated groups thought Rx worthwhile (93% but exercise only group less enthusiastic (57%) thought worthwhile

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Ganne (1988)
Stimulation of bone healing with interferential therapy
Aust J Physiotherapy 34(1):9-20
- 11 subjects, acute # tibia and fibula
- Matched with 11 subjects, equivalent # but no IFT
- Current applied post # reduction & POP through plaster windows
- 20Hz for 30 mins/day, 5 days a week
- Mean healing rate for controls = 17 weeks to union and for IFT group = 10.3 weeks to union

Sensory, Motor & Pain Thresholds for Stimulation with Medium Frequency Alternating Current
Ward A & Robertson V
- 2 groups of 11 non injured subjects
- Tested 20 different IF carrier frequencies between 1 and 35 kHz (all modulated at 50Hz)
- Measured voltage thresholds for sensory, motor and pain
- Sensory, motor and pain thresholds decreased with increasing frequency up to 10kHz
- Thresholds increased above 10kHz
- Ratios between thresholds varied at different frequencies
- Pain and motor thresholds most widely separated at 10kHz
- Therefore at this frequency can use higher voltage to get maximal muscular effect without pain

Contraindications
- Patients who do not comprehend the physiotherapist’s instructions or are unable to co-operate should not be treated
- Patients who are taking anticoagulation therapy or have a history of pulmonary embolism or deep vein thrombosis should not be treated with the vacuum electrode applications
- Similarly, patients whose skin may be easily damaged or bruised
- Application over:
  - The trunk or pelvis during pregnancy before 35 weeks
  - The eyes
  - The anterior aspect of the neck
  - The carotid sinuses
  - Patients with pacemakers
  - Dermatological conditions e.g. dermatitis, broken skin
  - Danger of haemorrhage or current tissue bleeding (e.g. recent soft tissue injury)
- Avoid active epiphyseal regions in children

Precautions
- Care should be taken to maintain the suction at a level below that which causes damage / discomfort to the patient
- If there is abnormal skin sensation, electrodes should be positioned in a site other than this area to ensure effective stimulation
- Patients who have abnormal circulation
- For patients who have febrile conditions, the outcome of the first treatment should be monitored
- Patients who have epilepsy, advanced cardiovascular conditions or cardiac arrhythmias should be treated at the discretion of the physiotherapist in consultation with the appropriate medical practitioner
- Treatment which involves placement of electrodes over the anterior chest wall