Physiotherapy Management of Pain

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PHYSIOTHERAPY MANAGEMENT OF PAIN

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HOW PHYSIOTHERAPY WORKS ?

WHERE WE ARE TODAY ?

SHORTWAVE DIATHERMY IN THE MANAGEMENT OF CHRONIC PELVIC INFLAMMATORY DISEASE PAIN: CASE REPORTS

EFFICACY OF ICE AND SHORTWAVE DIATHERMY IN THE MANAGEMENT OF OSTEOARTHRITIS OF THE KNEE – *A PRELIMINARY REPORT*

Low-Level Laser Therapy in Acute Pain: A Systematic Review of Possible Mechanisms of Action and Clinical Effects in Randomized Placebo-Controlled Trials. JAN MAGNUS BJORDAL, P.T., Ph.D.,1 MARK I. JOHNSON, Ph.D.,2

Transcutaneous Electrical Nerve Stimulation (TENS) for Pain Relief in Hospital

Effect of Iyengar yoga therapy for chronic low back pain -Kimberly Anne Williams

CHRONIC LOW BACK PAIN - COMPARATIVE ANALYSIS OF TREATMENT RESPONSE TO DRUGS AND DIFFERENT PHYSICAL MODALITIES

The Biological Effects of Low Level Laser Therapy with Static Magnetic Field on Acute and Chronic Pain -Aseel A. Al-sharify

PHYSIOTHERAPY MODALITIES

- PHYSIOTHERAPY MODALITIES
  - ELCTROPHYSICAL AGENTS
    - ELECTRICAL STIMULATION
      - TENS
      - IFT
    - THERMAL MODALITIES
      - HOT
        - * HOT PACKS
        - * IRR
        - * WAX BATH
      - COLD
        - * ICE PACKS
        - *ICE MASSAGE
        - *COLD SPRAYS
  - PHYSICAL TREATMENTS
    - *MOBILISATION /MANIPULATION
    - * MASSAGE
    - * YOGA

TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION (TENS)

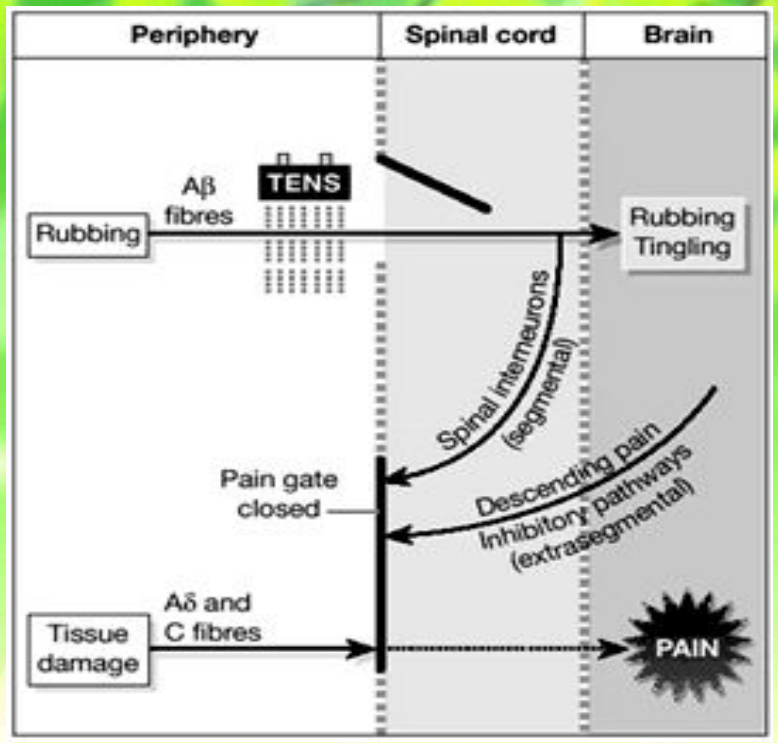
- Any stimulation in which a current is applied across the skin to stimulate nerves
- 1965 Gate Control Theory created a great popularity of TENS

Types of TENS :

Parameter	High-Freq TENS/ Conventional	Low-Freq TENS/ Acupuncture	Brief-Intense TENS
Intensity	Sensory	Motor	Noxious
Pulse Freq	60-100 pps	2-4 pps	Variable
Tx Duration	As needed	45+ min	15-30 min
Duration of Relief	Minutes to Hours	Hours	<30 min

MECHANISM OF PAIN RELIEF BY TENS

- **CONVENTIONAL / HIGH TENS :**
- A Beta fibers are stimulated to SG encephalin interneuron (pure gate theory)
- **ACUPUNCTURE /LOW TENS:**
- Level III pain relief, A delta fibers get Beta endorphins
- Longer lasting pain relief but slower to start

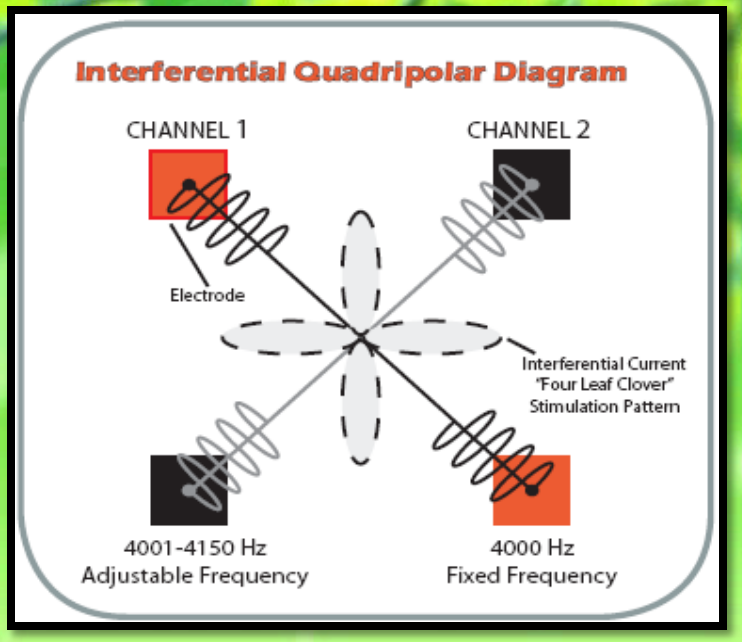


- Relatively higher freqeuncy (>50 Hz) induce localized block of conduction

INTERFERENTIAL CURRENTS

• IFC was neglected until 1970s when work on pain mechanism by Melzak and Wall illustrate that pain could decreased by stimulating primary afferent neurons

• IFC is produced by mixing two medium-frequency currents that are slightly out of phase, so that they 'interfere' within tissues, to produce Low Frequency (Beat Frequency) Effect inside the tissue.



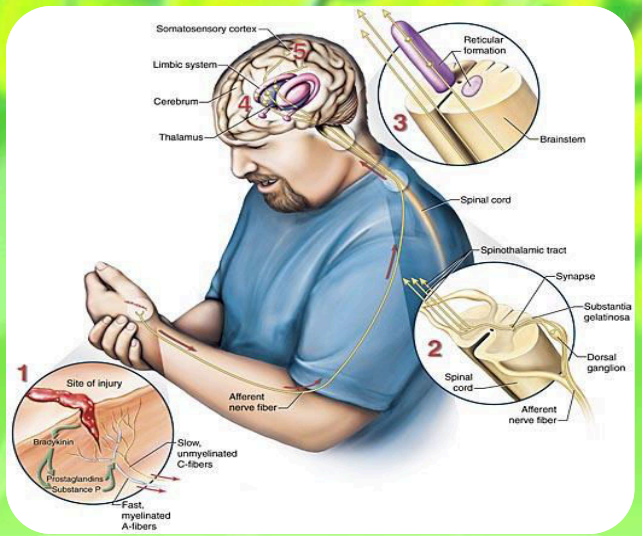
MECHANISM OF PAIN RELIEF BY IFT

♦ **Activation of pain Gate Control Mechanism :** Stimulation of Large Diameter affrerent nerve fibers closes the ' Gate' to nociceptive impulse in SG.
Beat Frequency- 100 Hz.

♦ **Activation of nociceptive fibers:** Activation of the nociceptive fibers diminish pain by means of descending Pain suppressor system.

♦ **Physiological Block :** Frequency above 50 Hz could cause a temporary physiological block in both myelinated & unmyelinated nociceptor nerve fibers
(A – Delta & C- Fibers)

♦ **Increased Blood Flow :** Stimulation of ANS – Vasodilation - removal of chemical irritants acting on pain nerve endings.



THERMAL MODALITIES

Superficial vs Deep Heating Agents

- **Superficial**
  - Primarily causes increases in skin temp and superficial subcutaneous tissue
  - Depths of penetration <2 cm
  - Hot Packs, Wax Bath , IRR
- **Deep**
  - Heat deeper tissues
  - Depth of penetration 3-5 cm
  - SWD, US

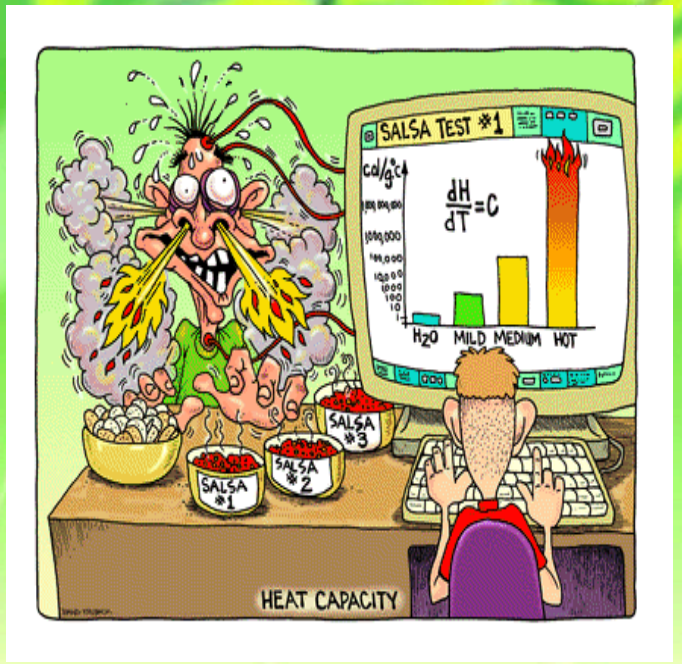
SUPERFICIAL THERMAL MODALITIES

MECHANISM OF PAIN RELIEF

- Stimulation of cutaneous heat receptors will produce a pain relieving effect via spinal segmental mechanism
- Pain associated with secondary muscle spasm or tension syndromes Is attributed to local ischemia resulting from partial occlusion of blood vessels within the muscle. Heat produces a hyperaemia within the muscle which resolves the ischemia and reduces pain.
- Local increase in circulation remove the chemicals stimulating nociceptors.
- Counter irritation effect .
- Psychological Reactions: Relaxation, Warmth & Sedation.

CRYOTHERAPY

- 1g of ice at 0^0C requires 491 J of energy to form water at body temp. 37^0C
- 1g of water at 0^0C requires only 155J to be raised to 37^0C
- Ex. Ice vs Water
- Superficial tissue temp. drop 15^0C (30-15^0C)within 2-5 mins.
- Deep tissuetemp. Drop about 5^0C(35-30^0C)

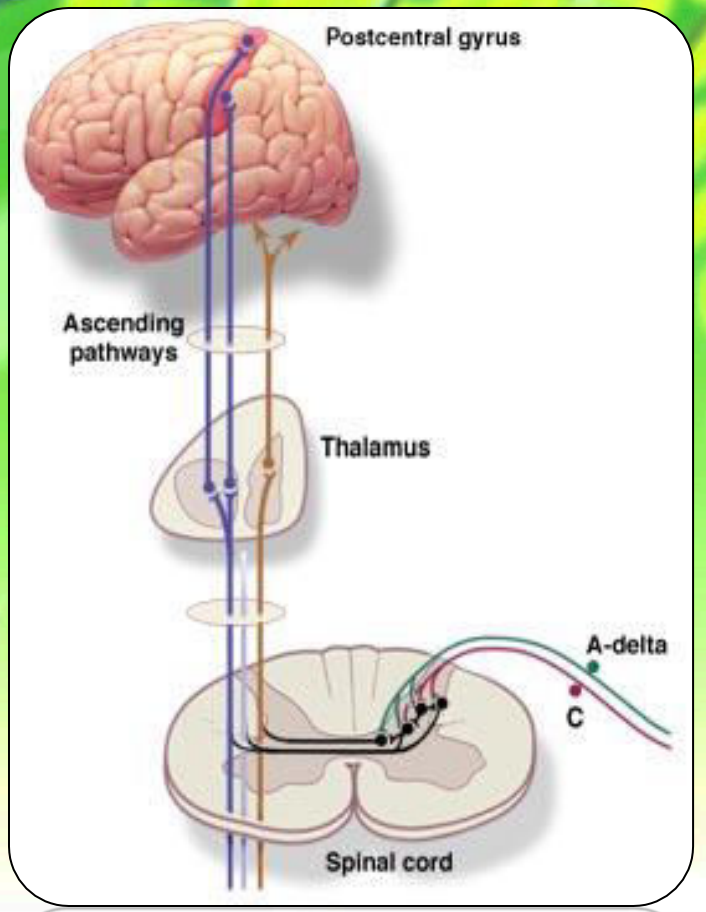


MECHANISM OF PAIN RELIEF BY COLD

❖A-delta and C fibers Conduction velocities decreased

❖Larger A fiber (alpha and beta affected last)

❖Lager A fibers and gamma motor neuron important in reducing spasm



DEEP HEATING MODALITIES

SHORT WAVE DIATHERMY

- High Freq. 27.12 Mhz.
- Wavelength. 11.06 m
- Heat Production by : Dipole rotation
  Ionic Motion.

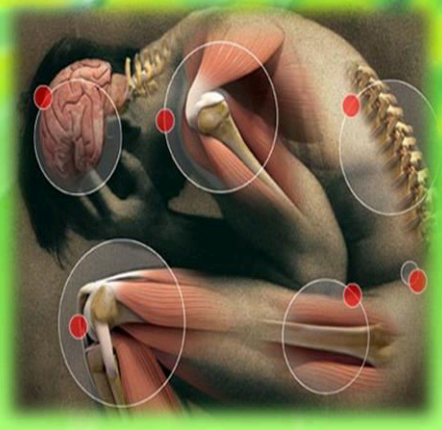
ULTRASOUND

- High Freq. 1 to 3 Mhz.
- Thermal Effect
- Non Thermal effect / Massaging effect

MECHANISM OF PAIN RELIEF BY HIGH FREQUENCY CURRENTS

❖ Mechanical stimulation provided by the moment of the ultrasound head over the tissue during treatment .

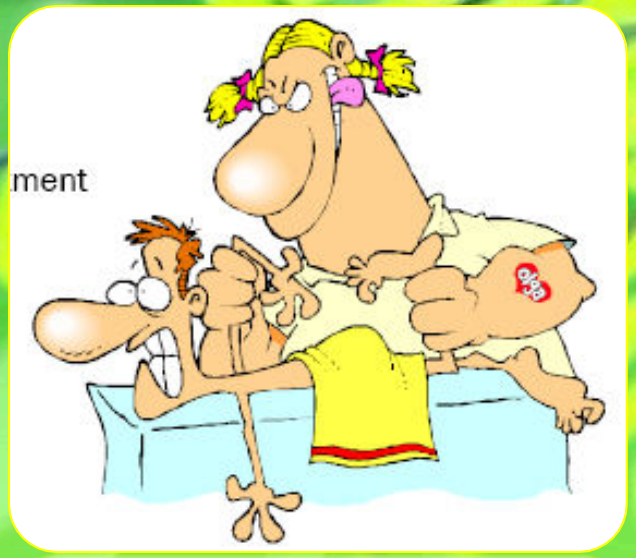
❖ this massaging of the tissue selectively stimulates low threshold mechanoreceptors & therefore increases large diameter afferent activity, with consequent activation of spinal segmental mechanism.



MOBILISATION / MANIPULATION

❖ **Mobilization** - is a passive movement performed slowly by the therapist, it is controlled enough that the patient can stop the movement any time.

✓ Goal is to provide a safe and effective means for restoring normal joint play and/or decreasing pain.



❖ **Manipulation** - involves a sudden, short amplitude, high velocity movement that the patient cannot stop.

MECHANISM OF PAIN RELIEF BY MOBILIZATION/MANIPULATION

Decreases pain by:

- Stimulation of joint mechanical receptors, producing inhibitory effects at the spinal level
- Causing increased release of endorphin and encephalin

MASSAGE

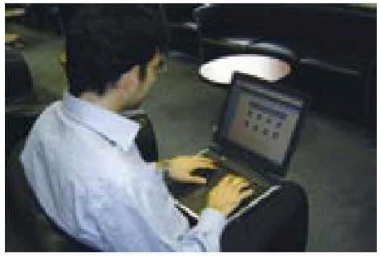
- According to Tappan, is defined as "the intentional and systematic manipulation of soft tissues of the body to enhance health and healing".
- It is applying pressure, tension, motion, or vibration —manually or with mechanical aids — to the soft tissues of the body.
- The massage technique used depends on the goal of the session.

Ex. Goals like increasing relaxation, increasing circulation, inducing a positive emotional state, decreasing pain.

MECHANISM OF PAIN RELIEF BY MASSAGE

- ❖ Stimulation of Mechanoreceptors
- ❖Psychological – Relaxation
- ❖Studies also showed massage therapy can increase the serotonin level for both infants (Field 1996) and adults (Ironson 1996).

Serotonin can inhibit the transmission of noxious nerve signals to the brain.



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Questions…?

Thank You…