Radiofrequency in pain management

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- RF current does not treat the cause of pain, its palliative effect allows the patient to return to normal daily activities and to function without pain.
- When appropriately applied to well-selected patients, RF current can produce analgesia sufficient to reverse the effects of chronic pain on the life of the patient.

- The use of electricity to treat pain was first described in 1931, when direct current was applied to the Gasserian ganglion for the treatment of trigeminal neuralgia.
- High-frequency alternating current(AC) was then introduced as a method of producing lesions of a predictable size.
- the frequencies used (350 to 500 kHz) were also used in radio transmitters, the procedure was termed radiofrequency.
- Today, the frequency used by modern RF machines (just below the AM band) to prevent interference with radio transmissions.

Fig. 178.1 Image of a radiofrequency generator.

Radiofrequency Lesion Generator

- a device used to produce lesions in the nervous system or other tissue by the direct application of high-frequency current to selected sites
- RF lesion generator has the following systems:
  - Continuous impedance monitoring
  - Nerve stimulation
  - Monitoring of voltage, current, and temperature
  - Pulsed current delivery mode.

- The current flows from the electrode tip through the body to a grounding electrode.
- The energy is focused around the active tip of the electrode and activates charged molecules (mainly proteins) to oscillate with the rapid changes in alternating current.

- This produces friction in the tissue that causes heat formation directly around the active tip.
- Heat is generated as a result of ionic oscillations of the charged molecules in the tissue, rather than direct heating of the electrode element itself.
- The formation of heat is greatest around the active tip, where the current density is largest.
- The grounding electrode serves to complete the circuit and to disperse heat buildup, thereby preventing a burn of the skin

- RF energy can be applied as either continuous or pulsed current.
- Continuous RF current heats the tissue surrounding the electrode and lyses the targeted nerve. destroys all fiber types within a nerve and is not selective for any one fiber type.
- Pulsed RF delivers RF current in small bursts and thus prevents the accumulation of heat around the electrode.

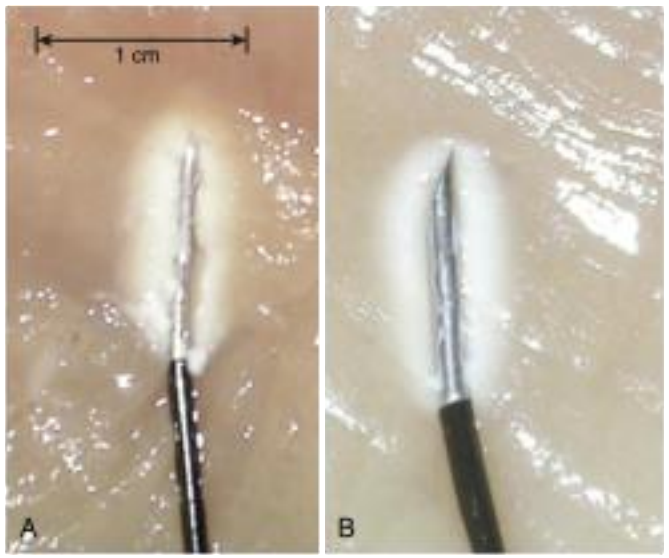
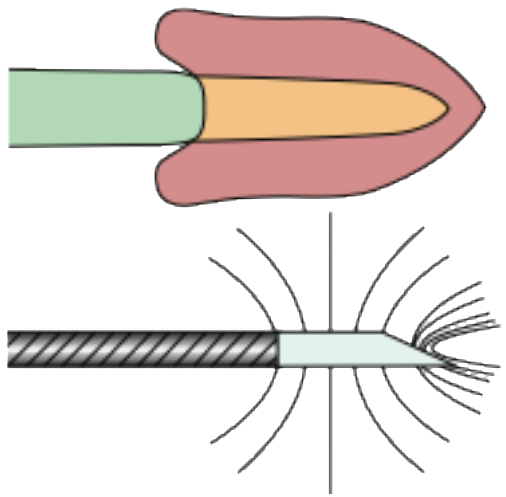
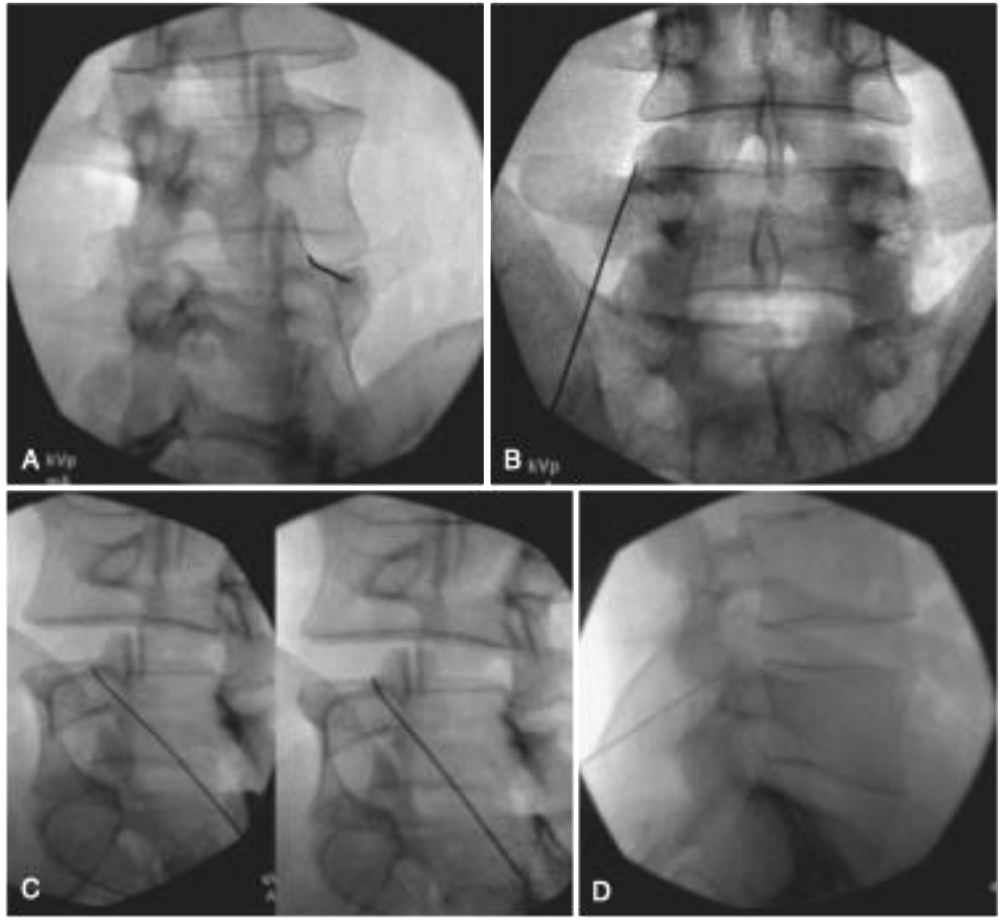


Fig. 178.3 **Image of radiofrequency lesions in meat.** A, A 20-gauge needle. B, An 18-gauge needle. *(Courtesy of Paul Dreyfuss.)*

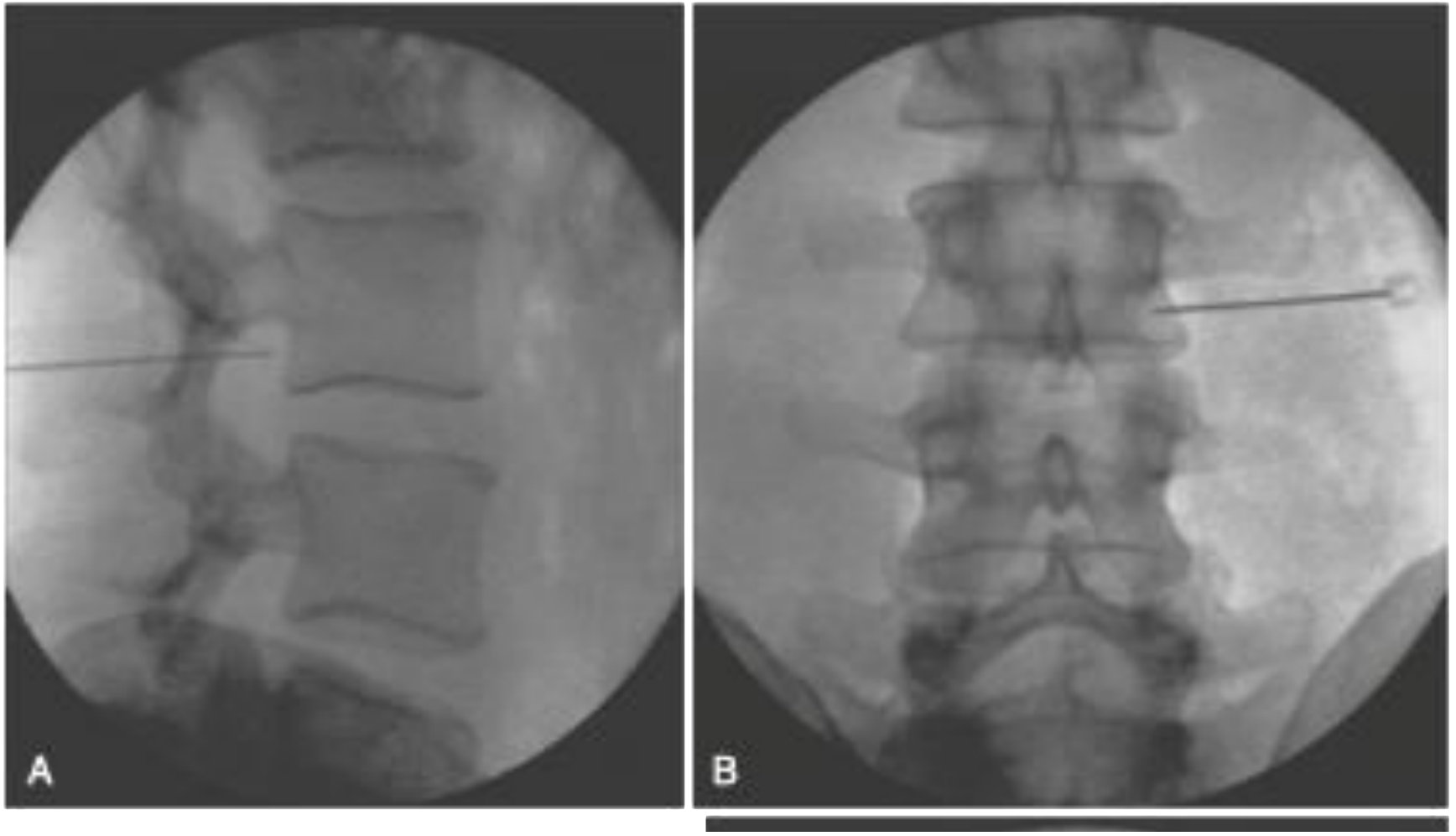


Clinical Applications of Radiofrequency Lesioning

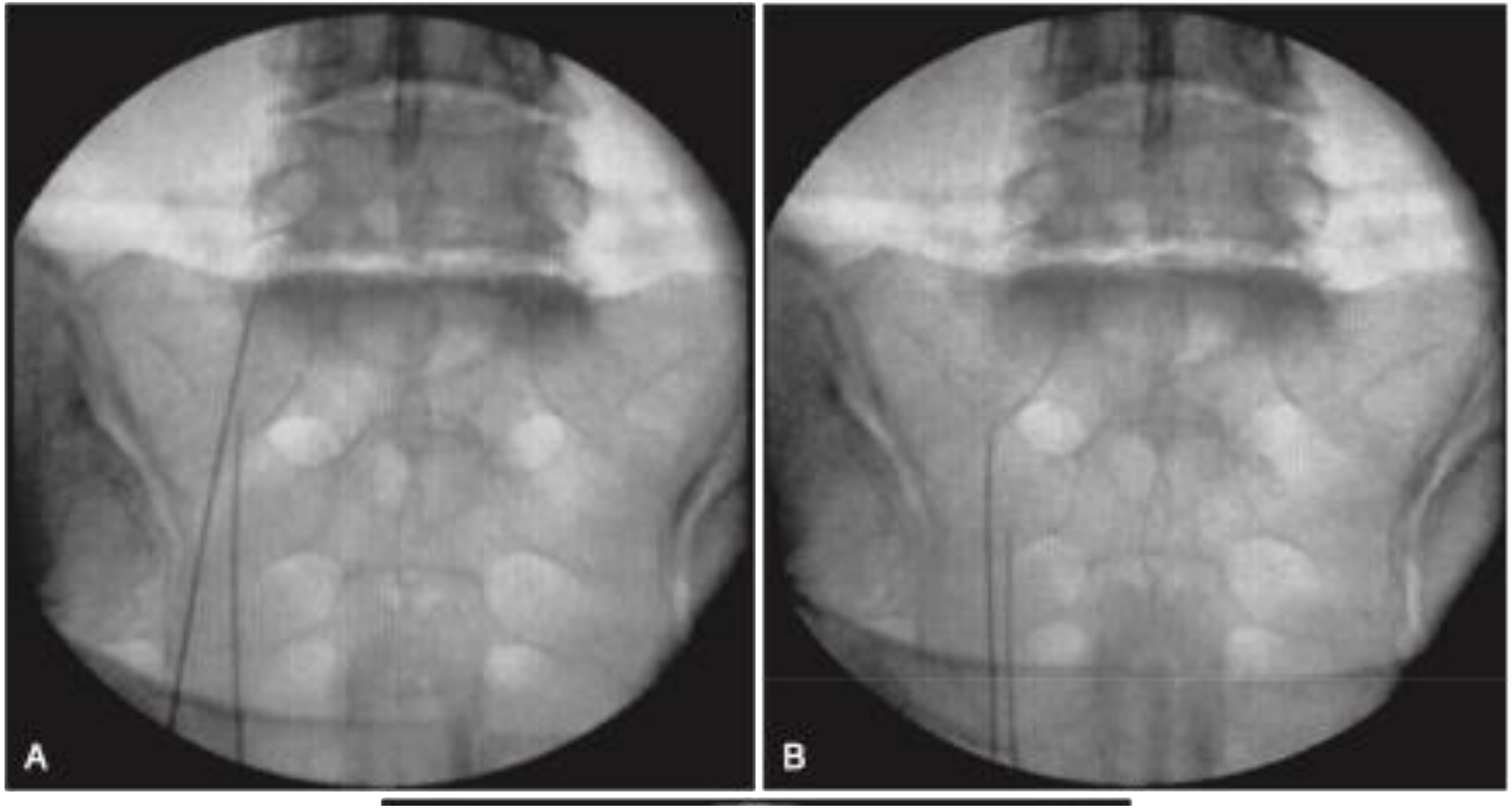
- Lumbar Medial Branch Radiofrequency



Lumbar Dorsal Root Ganglion Procedure



Sacroiliac Joint Radiofrequency



Physiotherapy in pain management

Definition

physiotherapy, also known as Physical therapy, is a healthcare profession that focuses on helping individuals maintain, recover, or improve physical function, mobility, and strength.

Physical therapists use evidence-based practices, exercises, and modalities to:

1. **Assessment and Diagnosis**
2. Rehabilitate injuries or illnesses:
3. Personalized **Exercise Programs**: exercises improve mobility, strength, and flexibility, reducing pain.
4. Manual Therapy: Techniques like massage, joint mobilization, and soft tissue mobilization alleviate pain and stiffness.
5. Modalities Techniques like heat, cold, electrical stimulation, or ultrasound therapy can reduce pain.

Therapeutic modalities

Also called electrophysical agents to describe all interventions that create physiological therapeutic effects.

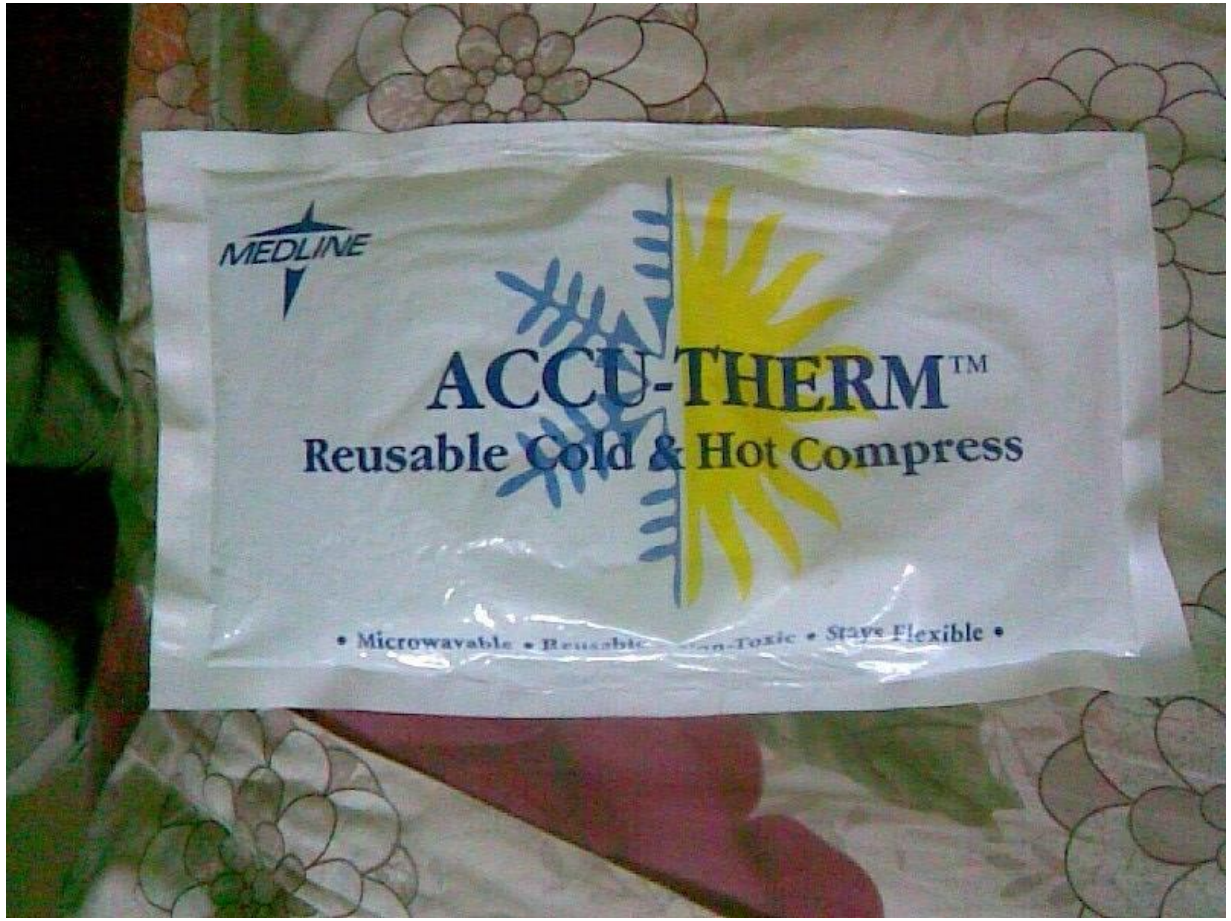
Examples

- Electrical stimulation / Iontophoresis
- Biofeedback
- Thermotherapy (superficial or deep)
- Cryotherapy
- Ultrasound / Phonophoresis
- Extracorporeal Shockwave Therapy (ESWT)
- Laser therapy
- Magnetic therapy
- Massage
- Mechanical traction

transcutaneous electrical nerve stimulation (TENS)

Biofeedback

Thermal Energy



Cryotherapy

Ultrasound

Extracorporeal Shockwave Therapy (ESWT)

Laser

Magnetic Therapy

Traction