Ex No. 01

Study of short-wave diathermy

AIM:

- To study the working of short-wave diathermy

THEORY:

Short-wave diathermy current is a high frequency alternating current. The heat energy obtained from the wave is used for giving relief to the patient. Its frequency is 27,120,000 cycles per second and the wavelength is 11 metre.

A shortwave diathermy unit is a device designed to generate radiofrequency radiation and transfer it, via cables and electrodes, to the area to be treated. The units can be operated in either a continuous wave or pulsed mode but both produce heat in deep tissue.

TWO FORMS OF SHORTWAVE DIATHERMY:

The units can be operated in either

- Continuous mode
- Pulsed mode

Two basic types of electrodes (applicators) are in use:

- Capacitor-type
- Inductor type

In the first case tissue heating is basically due to the radiofrequency electric field, while for the inductive electrodes (coils), heating occurs by a combination of electric field effects and currents induced in the tissue by the magnetic field. The heating profile of the two mechanisms is somewhat different.

These devices are capable of generating a sufficiently high level of radiation that there may be cause for concern for the safety of the gonads and, in the case of pregnant patients, the foetus. Improper use of the machine may result in burns and/or scalds and deep tissue or organ damage. It must be noted that the level of radiation present in the vicinity of a diathermy unit may be increased by the presence of nearby metallic objects or other units or by reflection from the wall. Care must be taken to ensure that the shortwave radiation does not cause interference with other equipment.

SWD is most commonly used for thermotherapy at a frequency of 27.12 MHz.

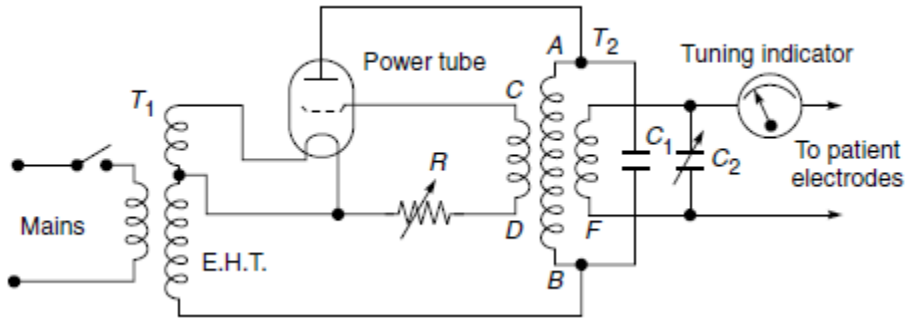
WORKING OF SHORT-WAVE DIATHERMY:

Short-wave diathermy heats the tissue by causing oscillations of electromagnetic energy of high frequencies. The physiologic effects of temperature occur at the site of the application and in distant tissue.

Circuit diagram of short-wave diathermy

The local effects occur due to the elevated local temperature which is associated with increased local blood flow, capillary dilatation and capillary permeability. It results in higher level tissue metabolism and more rapid transfer of nutritional ingredients to the end organs and tissues. It promotes faster healing. Short-wave heat increases connective tissue elasticity, reduces muscle spasm, and sedates the nerve endings to change the pain threshold.

Distant changes from the heated target location include reflex vasodilatation and reduction of muscle spasm, increase in body temperature, respiratory and pulse rates and decreased blood pressure. Diathermy increases white blood cell concentration in the area of chronic inflammation.



Simplified circuit diagram of a short-wave diathermy unit

TREATMENT:

Before administering the treatment the operator should:

- ensure that the thermal sensitivity of the patient is not impaired by analgesics,
- ensure that the patient has removed all metallic objects (rings, watches, metal rimmed glasses, etc.) from the treatment area,
- remove toweling or clothing from the treatment area,
- ensure that the skin is dry,
- ensure that if the patient is wearing a hearing aid, it is removed, ask the patient to report immediately any symptoms experienced during the treatment except 'a mild, comfortable warmth,
- ensure that the cables are correctly connected to both the machine and the applicator, not rest the applicator or cables over metal surfaces, align the applicator accurately to ensure an appropriate pattern of heating,
- ensure that the testes are not directly irradiated and that care is taken to minimize indirect irradiation,
- ensure that the cables leading to the applicator are not placed in the vicinity of the patient's non targeted tissue,

- ensure that the chair or other patient support is not metallic and that other large metallic objects are kept at least three metres from the electrodes and cables.

After activating the unit the operator should:

- remain at least 1 m from the electrodes and 0.5 m from the cables during treatment,
- ensure that the patient maintains the correct position and remains cooperative,
- not leave the patient during the treatment, unless the patient has been supplied with an emergency
- cut-off switch and the patient is reliable,
- not allow the patient to touch the unit,
- ensure that no other person is in the vicinity of the unit or of the applicator during the treatment, in accordance with the administrative controls established by the user.

TREATMENT TIME:

- Initial Stage : 5-10 minutes
- Moderate Stage : 10-20 minutes
- Severe State : 20-30 minutes

ADAVANTAGES:

1. Relaxation of the muscles
2. Effective in bacterial infections
3. Relief of pain

DISADVANTAGES:

1. Burns
2. Scalds (Boils)
3. Overdose
4. Shock
5. Electric Sparking
6. Faintness

Result:-

The working principle of short-wave diathermy is studied.