INSTITUTE OF ALLIED HEALTH SCIENCES

WMC POF WAH CANTT

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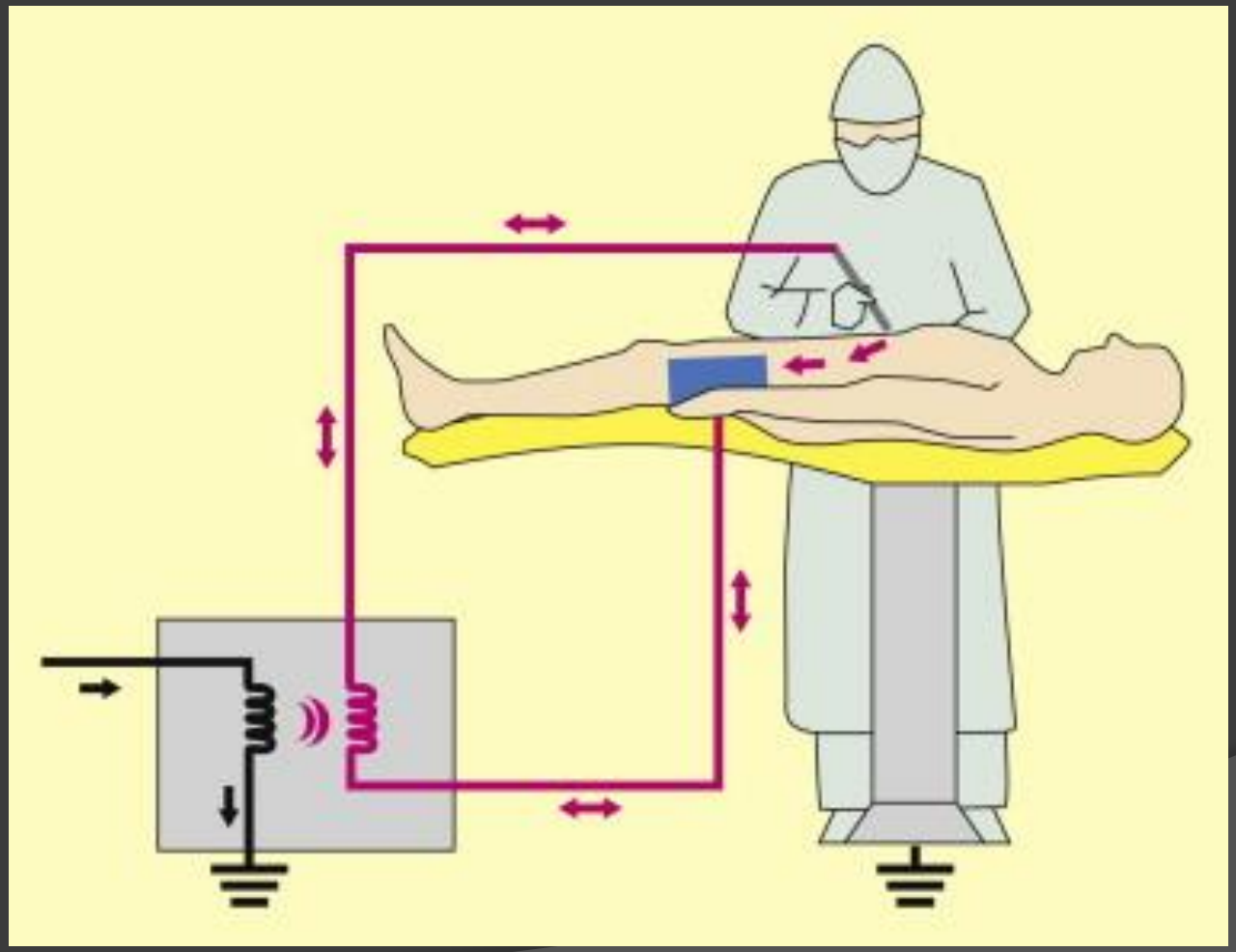
COURSE TITLE: APPLIED SCIENCES

Ground Rules for PPT

- Switch OFF your Mobile Phone.
- Everyone has to be participate.
- Start and Stop on Time.
- Keep side conversations to a minimum.
- Respect the opinions of others.

SURGICAL DIATHERMY



Background

In 1907, Berlin physician **Carl Franz Nagelschmidt** designed the first prototype diathermy. It took almost another 20 years before it generated enough interest in the United States to have physicians study the effects of high-frequency electrical currents on animals.

SURGICAL DIATHERMY

Surgical diathermy is a high frequency electric current machine to produce heat for cutting and coagulation.

WORKING

- Diathermy uses high-frequency electric current to produce heat deep inside a targeted tissue. It can reach areas as deep as two inches beneath the skin’s surface.
- The diathermy machine does not apply heat directly to the body. Instead, the waves generated by the machine allow the body to generate heat from within the targeted tissue.
- Diathermy is usually part of a complete physical therapy or rehabilitative regimen. Frequency and length of treatments vary.

FUNCTIONS OF DIATHERMY

There are two main functions of diathermy.

- Bipolar
- Monopolar

  The essential functioning part of the diathermy are two electrodes connected by heavy insulated wire to the terminal on the machine.

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- Alternately the coagulation and cutting parts may be selected by turning the switch on the diathermy machine itself. this is usually fitted to the machine to control the main supply.
- The live electrode which is used in the operating area, is sterilized before connecting to live terminals and machine

CONT...

- There are a variety of different shapes of electrode ranging from slender needle to a disc or a ball type point. these are connected to an insulated handle, which is then coupled to wire.
- The purpose of different electrodes is to provide a surface of sufficient area to avoid any physiological effects at the site of application point.

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- If the electrode is applied correctly, negligible is generated in this area.
- The in different electrodes at one time consisted of a lead plate wrapped in layers of lint shocked previously in a 15 to 20 percent solution of salt.
- Another disadvantage is that the strong solution of salt can cause a reaction to sensitive skin

PRINCIPLE OF DIATHERMY

- When the current is passed through the patient's body between electrode the effect is to produce a concentration of current at the electrode being used by the surgeon.
- As a surgeon applies his live electrode to the tissue the current passes through the adjacent tissue cells and owing to their electrical resistance, heat is generated at this point.

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- The effect is localized but the current from the `live` spread out the patient's body and travel to the indifferent electrode which is large electrode placed in contact with patient body.
- Blood vessels which are cut may continue to bleed it and it is necessary to apply the diathermy current specifically to the vessel to effect coagulation.

TYPES OF ELECTRODE

There are two types of electrodes.

- Flexible metal plate.
- Aluminum foil electrode.

FLEXIBLE METAL PLATE

- The commonest type of electrode is flexible metal plate. The thin metal plate electrode can either be placed under the patient`s body or carefully bandaged round the thigh to ensure even contact with the skin.
- It is unnecessary to use electrode jelly, though if a hairy site is chosen for application, shaving beforehand is advisable- the hair acts an electrical resistance.

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- If the patient`s skin is dry, moistening with water or saline can be done with an advantage before applying the plate.
- The electrode is concerned to the diathermy machine indifferent or each terminal by a heavy insulated wire.

ALUMINUM FOIL ELECTRODE

- It is a satisfactory type of electrode consists of aluminum oil half a thousandth of an inch backed with paper.
- A sheet of foil about 45.5 cm square (18 inch) square is placed under the patient body and connected to the insulated to the wire with stainless steel clips.

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- It has the advantages that it is cheap, can be autoclaved and is transparent to X-Rays.
- The foil electrode is particularly suitable for the use with infants.
- To detect a possible break in continuity of the different electrode connection, a monitoring system is usually incorporated in the diathermy machine.

EFFECTS OF DIATHERMY

The risk associated with electro surgical diathermy may be categorized as follows:

- Burns
- Electrical interference
- Danger of explosions
- High frequency current hazard

BURNS

- The predominant hazard associated with surgical diathermy is burns caused by excess current density.
- The burn usually occurs at the passive/ indifferent / dispersive electrode because of failure to achieve adequate contact.
- Arcing can occur with metal instrument and implants. Superficial burns may occur if use spirit based skin preparation.

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- The injury can also occur because an unintended current pathway may be created.
- Research shows that a current of 100mA applied for 10 seconds can cause second degree burn. Monitoring electrodes are also possible sites of burns.

DANGER OF EXPLOSIONS

In O.T, dangerous conditions can develop through use of cleaning agents such as ether, alcohol etc and by using explosive anesthetic gas or mixture with Oxygen. Spark gap diathermy, particularly, can cause explosion if proper precaution are not taken. If flammable gases are used, surgical diathermy be located out the zone in which anesthetic is used. Foot switches of the unit should always be explosion proof.

HIGH FREQUENCY CURRENT HAZARD

High frequency current hazard is the possible electrocution of the patient from faulty mains operated equipment, when one side of an electrical circuit is connected to earth. A capacitor is always used between passive electrode and earth for providing protection against electrocution.


Thank
you!