
بسم الله الرحمن الرحيم

Introduction to Electrical Stimulation

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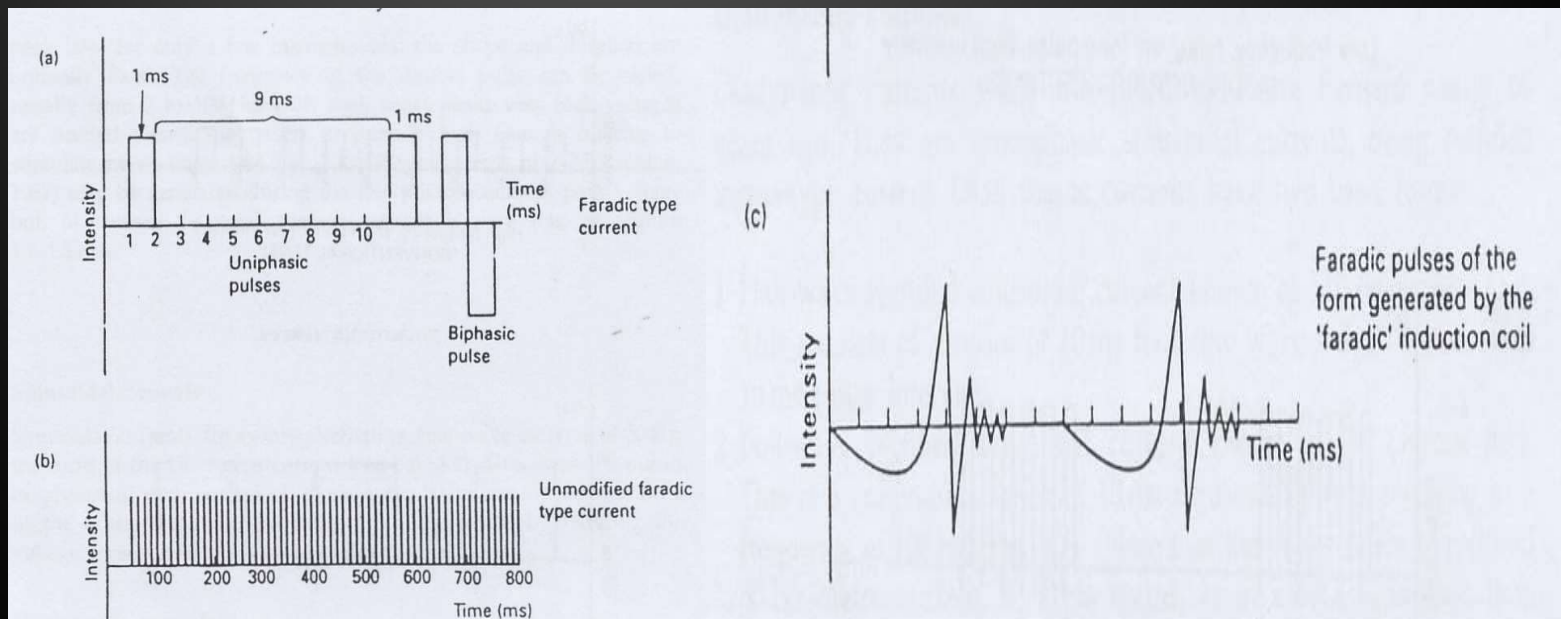
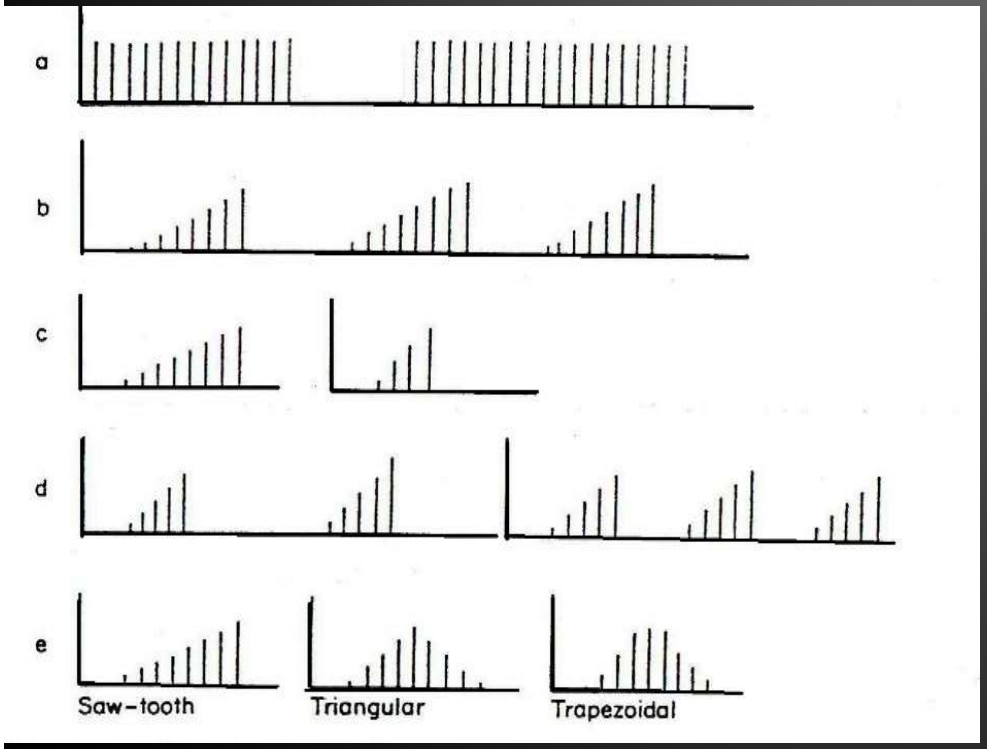
Faradic Type Current

- A faradic type current is a short duration interrupted direct current with a pulse duration of 0.1 - 1 ms and a frequency of 50-100 Hz . the term faradism was originally used to signify the type of current produced by a faradic coil The features essential for the production of these physiological effect are that impulses with a duration of between (0.1 - 1 ms) are repeated (50 -100 times per second).



Forms of faradic current available for modern stimulation.



- Unmodified
- In surges
- Surges varying in duration
- Varying interval between surges
- Surges varying in wave form.

Physiological effect of faradic type current:-

The tissues of the body are capable of transmitting an electric current because the tissue fluids contain ions and so are conductors. The conductivity of the different tissues varies according to the amount of fluid that they contain (for e.g. muscle, has a good blood supply and so is a good conductor while fat is a poor conductor).

Stimulation of the sensory nerve

- When a current of the faradic type is applied to the body;
- Mild prickling sensation is experienced;
- This is due to stimulation of the sensory nerve;
- The sensory stimulation causes a reflex vasodilatation of the superficial blood vessels;
- So that there is slight reddening of the skin (erythema).

Stimulation of the motor nerves

- A current of the faradic type stimulates the motor nerve;
- If the current is of sufficient intensity, it causes contraction of the muscles which they supply;
- So the current is commonly surged to allow for muscles relaxation;
- When the current is surged, the contraction gradually increases and decreases in strength in a manner similar to a voluntary contraction.

Effect of muscle contraction

- When a muscle contract as a result of electrical stimulation the changes taking place with in the muscle are similar to those associated with voluntary contraction ;
- There is increased metabolism;
- With a consequent increased in the demand for oxygen and food stuffs;
- An increased output of waste products, including metabolites;
- The metabolites cause dilatation of capillaries and arterioles;

- There is a considerable increase in the blood supply to the muscle.
- A muscle contract and relax they exert a pumping action on the veins and lymphatic vessels lying with in and around them;
- The valves in these vessels ensure that the fluid they contain is moved toward the heart;
- If the muscle contractions are sufficiently strong to cause joint movement this also exerts a pumping effect. Thus there is increased venous and lymphatic return.

Stimulation of the denervated muscles

- The current required to produce a contraction of the denervated muscle with an impulses for 1 ms is usually too great to be tolerable for treatment purposes. The faradic type of current is therefore not satisfactory for the stimulation of denervated muscles.

Chemical effects of the faradic type current

- When a direct current is passed through an electrolyte, chemical changes take place at the electrodes.
- If the chemical formed come in contact with the tissues there is a danger of electric burns;

Indications for use of faradic type currents

1.Facilitation of muscle contraction.

When a patient is unable to produce a muscle contraction or find difficulty in doing so, electrical stimulation may be of use in assisting voluntary contraction.

2. **Re-education of muscle action.**

Inability to contract a muscle voluntary may be the result of prolonged disuse. Faradic stimulation may be used to produce contraction and so help to restore the sense of movement.

3. **Training a new muscle action.**

After tendon transplantation or other reconstruction operation a muscle may be required to perform a different action from that which it previously carried out. A new movement pattern has to be established the muscle is stimulated with the faradic type current. So that it's new action is performed, and the patient must concentrate on the movement and attempt to assist with voluntary contractions .In this way the new muscle action may be taught.

4.Neurapraxia of a motor nerve.

In this case impulses from the brain are unable to pass the site of the lesion to reach the muscles supplied by the affected nerve. Consequently voluntary power is reduced or lost. There is, however, no degeneration of the nerve, so that if it is stimulated with faradism below the site of the lesion, impulses pass to the muscles, causing them to contract.

5.Severed motor nerve.

When a nerve has been severed, degeneration of the axon takes place and there is no longer a satisfactory response to stimuli of short duration. Degeneration takes several days, and for a few days after the injury a muscle contraction may be obtained with the faradic-type current.

6.Improve venous and lymphatic drainage.

Increased venous and lymphatic return is brought about by the pumping action of alternate muscle contraction and relaxation and of joint movement on the veins and lymphatics .It may be used in the treatment of oedema and sometimes for gravitational ulcer.

7.Prevention and loosening of adhesions.

When there is effusion into the tissues, adhesions are liable to form, but these can be prevented by keeping structures moving with respect to each other. If adequate active exercise is not possible, electrical stimulation may be used for this purpose adhesions which have formed may be stretched and loosened by muscle contractions.

Contraindications:

1. Certain dermatological conditions: Such as psoriasis, tinea and eczema.
2. Acute infections and inflammations.
3. Thrombosis.
4. Loss of sensation.
5. Cancer.
6. Cardiac pacemakers.
7. Superficial metals.


Any
Questions

Refrences

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