

# Diadynamic Current

Dr. Mohammed Taher Ahmed

E-mail-mommarar@ksu.edu.sa

dr.taher\_M@yahoo.com

mobile 0542115404



# Outline

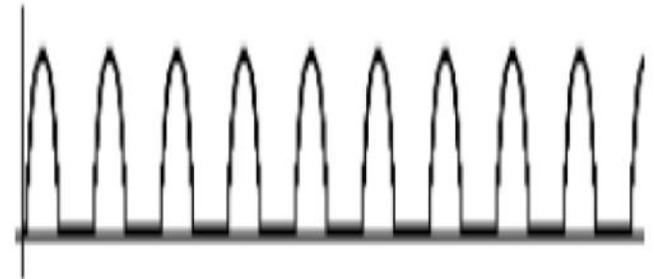
- Introduction and history
- Modulation of waves
- Types of diadynamic current
- Physiological effects
- Indications and therapeutic uses
- Contraindications and side effects
- Methods of applications

# History of Diadynamic

- Diadynamic current is discovered by *Pierre Bernar*, a French Dentist, in France, later spread to Russia, Germany, and Poland, in the late of 1960s and early 1970 spread to Canada and Australia.
- Basic principle of diadynamic current is modulation of symmetrical biphasic sinusoidal waveform.
- **Diadynamic** is a low frequency of (50-60Hz), with pulse duration is extremely long, (6-10msec).
- **Diadynamic** currents are mixed currents, which use effects of the concurrent application of galvanic and faraday, or other impulse-like currents

# ***Half-Wave Rectification (Single Phase or Monophasé Fixe (MF))***

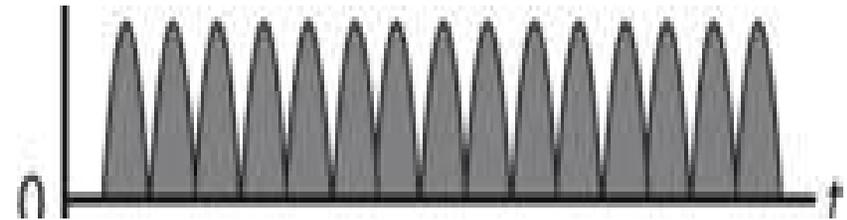
- Eliminates the second half of each AC cycle
- Produce a monophasic pulsed current
- Pulse duration equal to the inter-pulse interval
- Frequency equal to that of the original (50Hz).



This 50Hz causing excitation, facilitation and supporting muscle tone, it eliminates edema around the nerve envelope, reducing pain and supporting muscle tone.

# ***Full-Wave Rectification (Double Phase or Diphassé Fixe (DF))***

- Duplicate the second half of each AC cycle
- Direct monophasic current
- No inter-pulse interval
- Frequency is twice to original (=100Hz.)



# Types of diadynamic current

**1- DF**  
**(diphase Fixe)**

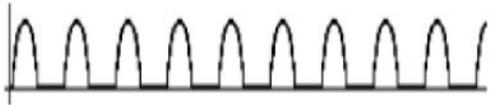
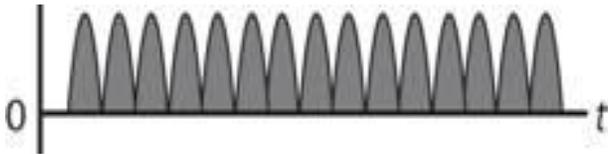
**2- MF**  
**(monophase Fixe)**

**3-CP**  
**(Courtes Periodes),**

**4- LP**  
**(Longues**  
**Periodes)**

**5-RS**  
**( Syncopal Rhythm)**

# Modes of DD

	<i>Fixed Monophasic (MF) Diadynamic</i>	<i>Fixed Diphasic (DF) Diadynamic</i>
<b>Wave rectification</b>	Half wave rectified alternating sinusoidal current	Full wave rectified alternating sinusoidal current
<b>Waveform</b>		
<b>Frequency</b>	50Hz	100Hz
<b>Pulse period</b>	10ms	Continuous series of 10ms impulse
<b>Interpulse interval</b>	10ms	NA
<b>Sensation</b>	Strong vibration	Stabbing & prickling
<b>Uses</b>	Treatment of pain without muscle spasm Connective tissue trauma [Ligament sprains) and Phantom pain	Improved circulation, Analgesia (100 Hz), Pretreatment for CP & LP

# Short Period (CP) Diadynamic

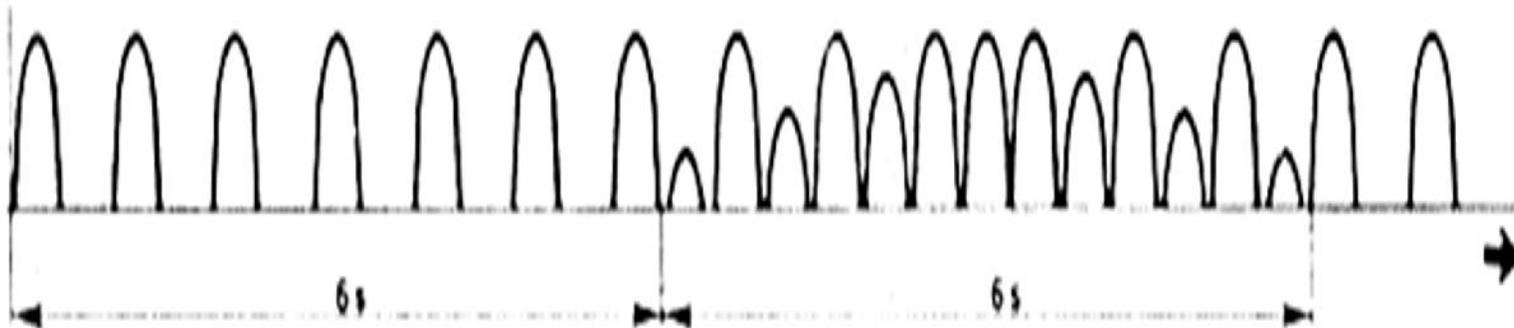
- ❖ Alternating delivery of equal DF (1second) and MF(1second),
- ❖ No intervening pauses.
- ❖ Abrupt changes between the tensing MF current and relaxing DF current.
- ❖ In DF, there are fine tremors
- ❖ In MF, there are strong and constant vibration
- ❖ Intensity of the MF current is 11 % lower than that of the DF
  - ❖ **Muscle & ligament traumas, acute injuries.**
  - ❖ **Heat may be a problem in acute cases. So cold packs can be used**



*CP rapid alternation between DF and MF.*

# Long Period (LP) Diadynamic

- ❖ Slow alternation between six 6 seconds of MF current and 6 seconds DF
- ❖ Peak intensity is varied (surged)
- ❖ The gradual raising and lowering in amplitude is associated with more pleasant sensation than produced by CP.
  - ❖ Neuralgia, myalgia, arthralgia & chronic pain conditions.
  - ❖ LP has a long lasting analgesic effect



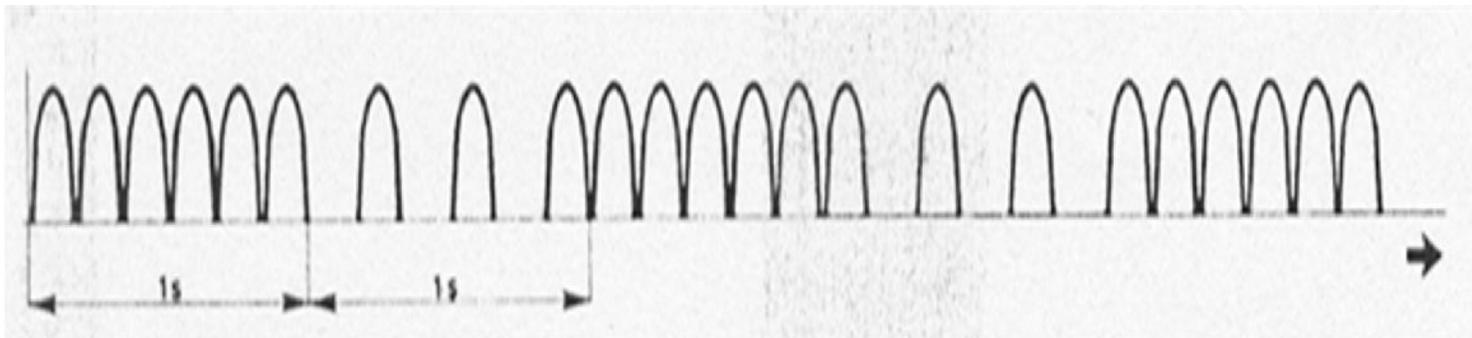
# Syncopal Rhythm (RS) Diadynamic

It is a delivery of fixed duration of MF, followed by equal rest duration (i.e. 1 second phase of MF followed by 1 second rest phase).

It can be used as

Faradic stimulation of muscles

Motor test of nerve excitability



# Physiological Effects

## *Masking of pain*

### **Direct mechanism**

Stimulation of sensory nerves leading to pain relief through stimulation of pain gate mechanism

### **Indirect mechanism**

Improving circulation through pumping action of muscle contraction with subsequent removal of irritant wastes

## *Vasomotor effects*

2- Increase local circulation due to  
Release of H-like substance due to polar effect  
Altering autonomic activity

## *Muscle stimulation*

Both CP&LP causes muscle contraction vi depolarization of motor nerve fibers but it is not the current of choice for muscle strengthening

## *Inflammatory effects*

Decrease inflammation and swelling  
Due to increased local circulation and change of cell membrane permeability

# *Therapeutic Effects and Indications*

## Therapeutic effects

- Relief of pain
- Decrease inflammation & edema.
- Muscle re-education
- Increase local circulation.
- Facilitation of tissue healing.

## Indications

- Soft **tissue** injury as sprains, contusions and epicondylitis
- Treating pain especially in small joints.
- Sudeck's atrophy.
- Peripheral nerve disorders as neuralgia, radiculopathy and herpes zoster.

# Contraindications and Side effects

## Contraindications

- ❖ Over neoplastic lesion.
- ❖ Over extreme edema.
- ❖ Over hemorrhagic area.
- ❖ Over osteomyelitis
- ❖ Over anterior cervical.
- ❖ Over transcranial area.
- ❖ Over electronic implants.
- ❖ Over superficial metal.

## Side effects

- ❖ **Skin breakdown and burn** : monophasic nature of diadynamic current may lead over time to skin damage and burn.
- ❖ This can be overcome by **short period** of application or **reversible of polarity**.



***Methods of Application of Diadynamic  
Current***

# Electrodes placements

## *Pain Spot Application*

**Bipolar;** in which two electrodes are positioned at each end of muscle belly .

**Monopolar,** in which one electrode may be placed on the motor point and the other proximal to it.

Electrodes is placed on both sides of the spine at the level of the nerve root supplying the painful area.

## *Myo-energetic Application*

## *Paravertebral Application*

## *Vasotropic Application*

Along the vascular paths affected the circulatory disorders being treated

## *Trans-regional Application*

To treat joint electrodes may be placed opposite to each other

## *Nerve Trunk Application*

two electrodes are placed along the course of the peripheral nerve trunk where it is superficial

# Dosage of Treatment

**Intensity:** The intensity of the currents should be increased, gradually as following;

1. The patient should feel the current intensity as **vibration, prickling, tingling, stabbing**
2. Increases intensity, the motor nerves are activated and the **muscles begin to contract.**
3. If the patient experience **slight pain & or burning sensation decrease intensity.**

## Duration of treatment

- ❖ Total application time is 12 minutes
- ❖ Single application time 3 minutes.

## Frequency of treatment

- ❖ 6-9 treatments either daily or day per day
- ❖ Maximum 12 treatment