Shortwave Diathermy

Objectives

- To learn what shortwave diathermy is.
- Learn the physiological effects of shortwave diathermy.
- Learn how to use shortwave diathermy in a clinical setting.
- To be able to differentiate between treatment techniques for continuous shortwave and pulsed shortwave diathermy.
- Learn setup and treatment guidelines for shortwave diathermy.

Indications and Contraindications

- Pro's and Con's

What is Shortwave Diathermy?

- Shortwave diathermy (SWD) is the application of high-frequency electromagnetic energy that is primarily used to generate heat in body tissues.

- The body is placed within an electrical field and becomes part of an alternating current that is generated from the SWD unit.

- This form of electrotherapy can be applied in either a continuous (CSWD) mode or a pulsed (PSWD) setting.

Physiological Responses

- The main effects of SWD are to increase deep tissue temperature, provide vasodilation, and increase the amount of blood flow to the affected area.

- Electrical currents usually penetrate 3cm deep.

- SWD is best modality to use if goal is to increase temperature.

What is Shortwave Diathermy?

(continued)

- Depending on the form of SWD you can elicit an thermal treatment or a non-thermal treatment.

- Heat is generated by the resistance of the passage of energy through tissues. Non-thermal effects are elicited through repolarization of damaged cells and the correction of their dysfunction.

- The depth of penetration of SWD is equal to or greater than ultrasound and greater than any infrared modalities.

(continued)
Clinical Applications

- SWD is commonly used in treating musculoskeletal injuries such as strains, tendinitis, tenosynovitis, bursitis, ligament sprains, and osteoarthritis.

- CSWD thermal effects
  - Local relaxation of muscles
  - Decrease pain and muscle spasm
  - Improve joint ROM
  - Increase elasticity of collagen fibers
  - Increase circulation

- PSWD non-thermal effects
  - Theorized to speed repair in slow-to-heal wounds, including nonunion fractures and tendinopathy.
  - Reduce swelling and inflammation
  - Increase the rate of collagen deposition and organization.
  - Increase nerve growth and repair.

Continuous Shortwave Diathermy (CSWD)

- Capacitance technique: creates a stronger electrical field rather than a magnetic field.
  - The athlete is placed between the electrodes and becomes part of the circuit.
  - Thus, the tissues that provide the most resistance inhibit the amount of heat transfer to the body. So areas of the body that have lower amounts of body fat tend to receive better electrical transmission.
  - Capacitance uses air space plates and pad electrodes to administer treatment.

- Induction technique: creates a stronger magnetic field and a lesser electrical field.
  - Induction methods create a eddy currents, small circular fields, within the tissues that cause heat generation.
  - In this method the athlete is not part of the circuit but part of a parallel circuit where the current will flow through the tissues that provide the least amount of resistance.
  - Induction uses cable and drum electrodes to distribute treatment.

Pulsed Shortwave Diathermy (PSWD)

- Instead of a continuous current it is a interrupted current.
  - The current is sent out as a high-frequency burst with short pulse durations thus providing the non-thermal effect with little to no sensory nerves stimulated.
  - Typically a drum electrode setup is used when administered.

Indications

- Joint inflammation
  - Use with caution because the deep heating can cause destruction of the collagen fibers.
  - Large areas that cannot be heated through other methods because of the size of the area.

- Fibrositis
  - Inflammation of fibrous connective tissue that surrounds the muscles and causes pain and stiffness.
**Indications**

- Myositis
  - Inflammation of a voluntary muscle that is characterized by pain, tenderness, and muscle spasm in the affected area
- Subacute and chronic inflammation of deep tissue layers
- Osteoarthritis
  - chronic degeneration of the cartilage of the joints

**Contraindications**

- Ischemic areas
  - Increased metabolic rate causes more hypoxia.
- Peripheral vascular disease.
- Metal implants or jewelry.
- Perspiration and moist dressings.
- Tendency to hemorrhage (including menstruation)
- Cancer
- Fever
- Sensory loss

**Pro’s and Con’s**

**Pros**
- Deep heating (2-5cm)
- Covers a large area
- Longer lasting effects than ultrasound
- Increases tissue temperatures over 7 degrees F.

**Cons**
- Can burn skin if sweating or touching the pads, plates, coils, cables or drum
- Many states require a prescription
- Cannot use over areas with excess adipose tissue
- Deep tissues burns are possible
- It is difficult to heat a specific area
- Costly (around $5,500)

**General Setup**

- There must **NOT** be any metal within the treatment area. This will cause collection and concentration of energy from the treatment.
- The clinician should remove all jewelry and watches.
- Cover the treatment area with a **DRY** terry cloth towel to absorb sweat. Excess sweat can accumulate heat from the treatment and lead to burns.
- Explain to the patient that the treatment will cause a mild warming sensation.

**Condenser Plate Setup**

- Adjust the plates so that they are parallel to the skin and 1 inch above the patient.
- This can be done by using a spacer. Make sure to remove the spacer before treatment begins.
- Consult the owner’s manual for preferred distance between the plates.
Condenser Pad Setup
- Cover the area to be treated with 6 layers of towels.
- Place the pads on the towels.
  - If being used on the same side of body, separate as far as possible
  - If being used on opposite sides of the body, make sure the patient does not lie on the pads
- Secure the pads in place with sandbags

Cable Method Setup
- Place 6 layers of towels around the body part
- Wrap the cable around the body part. Make sure to leave at least 1 inch between the coils and that the leads are equal length.
- Secure the cable ends so they don’t touch the patient, the machine, or each other

Coil Method Setup
- Form a coil of at least 3 circles covering the area treated.
  - The circles should be 1 inch apart and the inner most coil should be insulated.
- Insulate the skin with at least 6 layers of towels
- Place the coil on the patient and lightly secure with sandbags
- Position the leads so they do not come in contact with each other

Drum Method Setup
- Position the drum approximately 0.5 to 1 inch above the toweling.
  - There is a direct relationship between the distance of the drum and the intensity of energy required for the treatment

Application of SWD
- Setup for all different methods should be properly done prior to turning machine on and applying settings
- Turn the unit on
- Some units need to be tuned to allow for maximal energy transfer
- The patient should not move until the unit is turned off

Application of SWD
- Increase intensity until the athlete feels mild warmth.
- Always return the intensity to 0 before making any adjustment to placement or drying areas.
- Check in with the patient regularly
- Return the intensity to 0 before turning off the unit following the treatment.
  - Treatments should last 20-30 minutes and repeated as needed for 2 weeks.
QUIZ

- How far should the coils be spaced from each other?
  - A. 1 in
  - B. 1 cm
  - C. 2 in
  - D. 3 cm

- How long should treatments last?
  - A. 15-20 minutes per session for 2 weeks
  - B. 25-35 minutes per session for 3 weeks
  - C. 20-30 minutes per session for 2 weeks
  - D. 30-40 minutes per session for 1 week

- Which is NOT a type of SWD method?
  - A. Coil method
  - B. Drum method
  - C. Circuit method
  - D. Cable method

- SWD increases the temperature by
  - A. 2 degrees F
  - B. 9 degrees C
  - C. 7 degrees C
  - D. 9 degrees F

QUIZ

- Which of the following does NOT consist of the thermal effects of Continuous Shortwave Diathermy (CSWD)?
  - A. Increase circulation
  - B. Decrease pain and muscle spasm
  - C. Reduces edema and inflammation
  - D. Increases joint ROM

- In the coil method, how many circles should cover the area being treated?
  - A. 2
  - B. 3
  - C. 4
  - D. 6

- Which is a contraindication for SWD?
  - A. Myositis
  - B. Osteoarthritis
  - C. Ischemic areas
  - D. Joint inflammation

QUIZ

- In the coil method, how many circles should cover the area being treated?
  - A. 2
  - B. 3
  - C. 4
  - D. 6

- Which is a contraindication for SWD?
  - A. Myositis
  - B. Osteoarthritis
  - C. Ischemic areas
  - D. Joint inflammation

QUIZ

- In the coil method, how many circles should cover the area being treated?
  - A. 2
  - B. 3
  - C. 4
  - D. 6

- Which is a contraindication for SWD?
  - A. Myositis
  - B. Osteoarthritis
  - C. Ischemic areas
  - D. Joint inflammation

References


5