

CONNECTICUT VALLEY HOSPITAL

**Physical Therapy Services**

**PT Equipment Procedure # 14**

**Re:    Ultrasound**

**Date:   March 20, 2000**

**Revised: October 19, 2008**

**Description:**

Ultrasound is a form of deep heat that utilizes sound waves to penetrate deeper than other types of heat (1 ½"– 2 ½"). Ultrasound is used as a selective deep heat application to:

1. Increase metabolic rate of tissues.
2. Decrease muscle tension.
3. Increase local blood flow.
4. Increase capillary permeability, filtration, and hydrostatic pressure.
5. Increase oxygen to tissues via blood; decreased ischemic pain.
6. Decrease joint stiffness.

**Indications:**

1. Soft tissue shortening (joint contractures, scarring).
2. Subacute and chronic inflammation (bursitis).
3. Painful conditions such as muscle guarding, neuroma or trigger areas.
4. Warts.
5. May be used in conjunction with electric stimulation.

**Contraindications:**

1. Over the eyes.
2. Over a pregnant uterus.
3. Directly over the heart.
4. Over metal implants fastened with cement.
5. Intrathecal Drug Delivery Implants.
6. Over epiphysis of growing bones.
7. Malignancies.
8. Directly over spinal cord if a laminectomy has been done.
9. Area of sensory loss.
10. All general contraindications to heat.

**Precautions:**

1. Maintain consistent energy transfer or burns could result:
  - a. Keep sound head moving.
  - b. Maintain even contact.
  - c. Remove air bubbles.
  - d. Keep off bony prominences.
2. Do not hold sound head in the air for longer than a few seconds; the crystal could shatter or depolarize, its cement could melt, or the transducer could become very hot.
3. Avoid the use of intensities higher than those considered to be therapeutic. High intensities produce cavitation (formation and growing of dissolved gas bubbles, which can tear tissue or create sites of high-energy concentration through their vibration and absorption of energy).
4. Be cautious about sonating over anesthetized skin; could lead to excessive heating.

**Procedures:**

1. Patient's medical history is to be reviewed. Can be selected for ultrasound treatment of condition if indicated. Observe contraindications carefully.
2. Instruct the patient about the treatment and what is expected.
3. Identify the area to be treated, then position and drape patient for comfort, modesty and easy accessibility.
4. Select appropriate frequency range. High frequency (3 MHz) waves are absorbed more easily and do not penetrate as deeply. Low frequency (1 MHz) waves penetrate to deeper tissues.
5. Select coupling medium:
  - a) Conductive gel: for smooth surfaces, maintain firm contact throughout treatment.
  - b) Water coupling: for irregular surfaces, the part to be treated may be immersed in tepid water. Hold sound head 0.5 to 1.0 inches from skin and parallel to it.
6. With either type of coupling, keep sound head moving at the rate of about 4 inches per second.
7. Power and time govern dosage.

Power: Safe range of intensity is 0.5 to 3.0 watts/cm<sup>2</sup>.

Time: Duration of treatment is 5-10 minutes per site.

General dosage guidelines:

- Connective tissue shortening: higher doses to maximize temperature increase.
- Painful conditions: moderate doses.
- Thin tissues/superficial conditions: lower doses.
- Thick tissues/deep conditions: higher doses.
- Acute conditions: lower doses.
- Chronic conditions: higher doses.

8. Post-treatment: Turn power off before removing sound head. Clean sound head. Evaluate general physiological response and perform skin inspection.
9. Frequency – May be used daily initially and then decreased with improvement in condition.
10. Duration – No more than 15 ultrasound treatments should be given to any one area.
11. Clean Ultrasound machine as per Physical Therapy Cleaning Procedures.
12. Each Ultrasound machine receives Biomedical Testing annually in January of each year.