

Laser

Terminology

- Electromagnetic Spectrum
 - Frequencies fall within this
- Nanometers
 - Wavelength
 - 830 nm is most affective today
- Milliwatts
 - Power
- Photons
 - Can be seen as wave particles or packets
 - Well organized and direction
- Joules
 - Dosage is the single most important parameter for successful outcome
 - Amount of energy delieverd at the skin
- Monochromatic
 - Laser emits pure light at a specific wavelenght
- Coherent
 - Exclusive property of the light that is directional and in phase
 - Travels in a straight line
 - Increases the depth of penetration- serves as a vehicle to deliver laser light farther
- Collimated

Contraindications:

- Tattoos
- Malignancies
- Growth plates

★ *Laser affects mitochondrial part of cell causing increased produced to ATP to decrease inflammation and pain*

Erchonia Laser

635 nm
 5 milliwatts
 Normally 2 diodes- 1 J comes out of each one of them (9 J is total treatment)
 Usually start treatment at 1 min or 1 min 20 seconds

Turn clockwise
 A1 = 9 Hz
 A2 = 16 Hz
 B1 = 42 Hz
 B2 = 53 Hz
 All frequencies are set to treat all musculoskeletal conditions after this is set

★ *Very effective on plantar fasciitis*

To change the time you push the clock

Microlight

830 nm
 90 milliwatts
 3 Diodes in front- 1J out of each one of them
 LED light to show you where you're treating (not treating with that light)
 33 seconds get a total of 3 Joules - do it three times for 9J total
Better and cheaper than erchonia

Laser Classification

- Class IIIa
- Class IIIb
- Class IV

Green Laser

- 532 nm
- Less than 30 milliwatts- one also is 90 milliwatts
- Effective for trigger points
- Hold on spot for 15-20 seconds
- Re-check and re-treat if needed

Chattonooga

- 840 nm
- 90 milliwatts
- Cluster probe applicator

Class IV Laser

- Roller ball on end that you can put over joint and move around

MedEx Laser

- 2 diodes
- 635 nm
- 5 mw

L.E.D.'s

- NOT lasers
- Light Emitting diodes
- Heats Tissue
- For deep penetration and more effective treatment laser therapy is better

3/6/09

Interferential Under Water

- Used for treating conditions like carpal tunnel, acute sprain/strain of wrist, epicondylitis of elbow, extremity problems
- Use carbon electrodes and place on four corners of water bath (quadrapolar application)
- Acute: 80-120 Hz
- Chronic: 1-10 Hz
- Sweep but no vector
- Tx time = 10 min
- Place hands in the middle of the water bath
- Contraindications
 - Hemorrhages, Infections, Malignancy, open wounds

Interferential Dual Frequency

- Used for long lasting pain relief
- Produce endorphins and enkephalins cause use two different frequencies
- 15 min treatment
- Frequency set to 80-120 Hz to help produce endorphins
- Then push 3-5 Hz and set
- Pre-mod, sweep

Light Therapy

- Solaris EMS
- Cluster Probe
- Creates heat (like an infrared lamp)
- 9 J

Phonophoresis

- Use the ultrasound unit
- Ultrasound gel and biofreeze use (3:1 ratio)
- Frequency of 3 megaHz
- 3 watts/sonometer 2
- 10% duty cycle
- 6-8 minutes
- Driving ions into the tissues to get an analgesic effect and help with the healing
- Contraindications are same as ultrasound

Iontophoresis

- Specific ions and drive into tissues
- For example if treating a fungus type infection you'd use copper sulfate
- Bromoline used for inflammatory type problem
- Never over 5 milliamps (you'll cause a burn) 3 milliamps is suggested
- Self adhesive electrodes with solutions already injected- attach lead wire to it
- Also have a dispersive electrode
- Iodine = used for adhesive capsulitis and reduction of scar tissue - it's a negative ion so we set the polarity for negative

- Calcium = positive ion- used for spasticity and adhesive capsulitis- so polarity set for positive

4/9/09

Review for Quiz

1. What type of conditions (name them and be specific) would you consider using IF immersion therapy for?
 - a. Carpal tunnel, sprain/strain of wrist/ankle, Medial and lateral epicondylitis
2. What is the purpose for using dual frequency IF?
 - a. Treating Hyperacute pain for long lasting pain relief - you get endorphins and enkephalins produced by total of 30 min treatment
3. What type of current is used for driving specific ions into tissues called iontophoresis?
 - a. Galvanic- same thing as direct current
4. List 3 contraindications for the use of cold laser
 - a. Pregnancy
 - b. Malignancy
 - c. Growth plates
 - d. Tattoos
 - e. Patients with recent steroid injections
 - f. Thyroid condition
 - g. Stay away from eye
5. List the Musculoskeletal frequency's for the Erconia Laser
 - a. Pain = 9
 - b. Muscle = 16
 - c. Lymph = 42
 - d. Organs = 53
6. List all the parameters for using iontophoresis
 - a. Current type: galvanic
 - b. Intensity: not more than 5 milliamps
 - c. Polarity: depends on what ion you're using
 - d. Time of treatment: 15 minutes
 - e. Application technique: bipolar
7. List all the parameters for phonophoresis
 - a. Frequency: 3.3 mhz
 - b. Intensity: 3 watts/cm²
 - c. Duty Cycle: 20%
 - d. Time of treatment: 6-10 minutes
 - e. Solutions used: biofreeze, ibunex
8. List all the parameters re: micro-current application using the intellect legend XT for acute medial epicondylitis of the left elbow
 - a. Method: pads
 - b. Polarity: positive
 - c. Frequency: 10
 - d. Treatment: 10 min
 - e. Intensity: 50 microamps
 - f. Channel #: 1
 - g. Application technique: bipolar
9. In attempting to treat a patient with acute lateral epicondylitis using iontophoresis, you connect the electrode with the solution to the positive pole. Which of the following solutions are you most likely to administer
 - a. Bromelain
 - b. Copper sulphate
 - c. Iodine
 - d. **Magnesium sulphate**
10. List three negative ions you could use for iontophoresis and list what conditions you would use each for
 - a. Ions
 - i. Bromoline = Anti-inflammatory
11. The frequency used for green LASERS are?
 - a. Wavelength: 532 nm
 - b. Power: 50 millivolt
12. TENS settings for treating acute conditions are?
 - a. Pulse width: narrow -200
 - b. Pulse rate: 75
13. List 2 solutions that can be used with phonophoresis immersion therapy
 - a. Biofreeze
 - b. Ibunex

14. Altering the dosage of a laser is done by altering the?
 - a. Time
15. Which on-off cycle would be the best for reducing a muscle spasm using biphasic therapy?
 - a. 10/10
16. Light therapy is a form of?
 - a. Mechanical energy
 - b. **Electromagnetic energy**
 - c. Superficial heat
 - d. Deep heat
 - e. None of the above
17. What duty cycle would be selected for chronic conditions when using ultrasound?
 - a. 100%
18. You can use a combination of electrical stimulating currents and ultrasound to treat various orthopedic conditions. Name 3
 - a. Active Trigger Points
 - b. Sprain/Strain
 - c. Facet/disc injury
19. Contraindications and precautions for TENS would include: List 4
 - a. Pacemaker
 - b. Pregnancy
 - c. Fracture
 - d. Malignancy
20. List all the parameters for combination therapy using phonophoresis, high volt immersion application when treating chronic conditions?
 - a. Channel #: 1
 - b. Duty cycle: 20%
 - c. US frequency: 3
 - d. US intensity: 3
 - e. High volt frequency: 1-10
 - f. Polarity: Negative
 - g. Solutions used: Ibunex
 - h. High volt intensity: patient perception
 - i. Time of tx: 10 min

Review Questions for Final

1. Using specific e-stim at 2500 hz has a frequency of 50 hz for tetany what is the stimulation a set up for? Russian stim
2. Larger the size of the electrode when using e-stim the more sensation the patient feels beneath pad - FALSE
3. Matching
 - a. Superficial heater- hot/moist heat
 - b. Deep heater- ultrasound
 - c. Medium frequency = biphasic
4. When using interferential therapy or emersion Acute tx frequency = 80-120
5. Nerve Block frequency = 4000 Hz
6. Modes of tx for biphasic are:
 - a. Coplanar, longitudinal, **reciprocal, co-contraction, normal**
7. Four stages of COLD (CBAN)
 - a. Cold
 - b. Burning
 - c. Aching
 - d. Numbness
8. Best application of ice therapy
 - a. Ice pack placed over a Moist towel
9. Modality does not decrease swelling?
 - a. Evaporative coolents
10. Low frequency alternating current you want a series of muscle strengthening
 - a. Set mode to surge
11. Electrons flowing in an alternating current always move from positive to negative reversing direction when current does?
 - a. FALSE
12. Skin resistance generally high with direct current than with alternating current
 - a. TRUE
13. What modality is considered best for pain control
 - a. Interferential

14. How to determine intensity for trigger point therapy?
 - a. Patient feedback
15. When using e-stim electrodes of different sizes are used in monopolar/unipolar application technique
 - a. TRUE
16. Electrons are the energy transfer unit in laser therapy
 - a. FALSE
17. All lasers have visible light?
 - a. FALSE
18. Intensity of laser is measured in joules?
 - a. TRUE
19. Following modalities are considered low frequency
 - a. **Hi volt**, microcurrent (ultra low frequency), **low volt ac, tens**, short wave diathermy
20. Ultrasound therapy
 - a. Expansion and contraction of the crystal that transforms electrical energy into mechanical energy in the form of sound waves = this process is the *pizelectric effects*