Chapter 1: The Science of Therapeutic Modalities

- Electromagnetic spectrum vs. acoustic spectrum
- Radiant energy
- Relationship between wavelength and frequency
- Laws governing the effects of electromagnetic radiations
  - Arndt-Schultz Principle
  - Law of Grothus Draper
  - Cosine Law
  - Inverse Square Law

Chapter 2: The Healing Process and Guidelines for Using Therapeutic Modalities

- General knowledge of the three phases of the healing process:
  - Inflammatory
  - Fibroblastic
  - Maturation
- Signs of Inflammation
- Vascular response to inflammation
- Discussion of different chemical mediators and their role in the inflammatory process
- Process of Clot Formation
- Differences between Acute and Chronic Inflammation
- Factors that can impede the healing process
- Appropriate uses of modalities during the different phases of inflammation
  - Which modalities should and shouldn’t be used during certain phases of the inflammatory process
- Primary goals of each phase of inflammation
- Factors that can influence choice of modalities:
  - Indications
  - Precautions
  - Contraindications
Chapter 3: Managing Pain with Therapeutic Modalities

Types of pain
- Acute vs. chronic
- Referred
- Radiating or radicular
- Trigger points

Pain threshold vs. pain tolerance

Assessment of Pain
- VAS
- Pain charts
- McGill Pain Questionnaire
- Numeric Pain Scales

Variation of pain sensitivity within tissues

Neural transmission of pain
- Afferent pathways
  - 1\textsuperscript{st} order
  - 2\textsuperscript{nd} order
  - 3. order
- Efferent pathways

Types of nerve fibers
- A-beta, A-delta, and C
  - Differences in size, myelination, speed of transmission, etc.

Primary hyperalgesia vs. secondary hyperalgesia

Pain Control Theories
- Gate control theory
  - Structures involved, mechanisms of action, results, etc.
- Descending pain control theories #1 & #2

Management of pain

Chapter 4: Basics of Electricity

Differences between series and parallel circuits and their application to modalities

Types of Electrical Currents:
- Direct
- Alternating
- Pulsatile
  - Monophasic
  - Biphasic
  - Polyphasic
Anatomy of a Waveform:

Pulse
Phase
Amplitude
Interpulse Interval
Interphase Interval
Rate of Rise
Rate of Decay
Pulse duration
Pulse period
Frequency
Ramp

Importance of Current Modulation and Accommodation

How “current” flows through the different tissues

Physiological response to electrical currents

Safety concerns

Chapter 5: Electrical Stimulating Current

Selective stimulation of nerves

Strength duration curve
What it tells us about amplitude, phase duration and nerve stimulation

Therapeutic current Parameters
Alternating vs. direct current
Tissue impedance
Current density
Frequency of wave or pulse
Intensity of wave or pulse
Duration of wave or pulse
Polarity
Electrode placement
Monopolar vs. bipolar vs. quadpolar configuration

Parameter adjustments for specific treatment goals
Pain reduction
Muscle reeducation
Swelling

Therapeutic waveforms
Monophasic
Biphasic
Interferential
Russian
Chapter 6: Iontophoresis

Theory behind how Iontophoresis works

How Current Density and electrical impedance can effect ion movement

Factors that effect ion transfer

Tx Parameters:
  - Current Intensity
  - Tx Duration
  - Dosage of Meds

Electrode Set-up

Ion selection

Indications, Precautions, Contraindications

Burns
  - How to minimize
  - Tx

Chapter 7: Biofeedback

What is biofeedback and how is it used clinically?
Electromyographic (EMG) feedback
  - How does it work?
  - What does it measure?
  - Parameter set-up for muscle reeducation or relaxation
Use of a mirror for biofeedback

Terminology:
  - Ampere
  - Coulomb
  - Conductance
  - Insulation/Impedance
  - Ohm’s Law
  - Voltage
  - Electrical Power: Volts x Amperes=Watts
  - Electrical Current
  - Wolff’s Law