

CLASSIFICATION OF MODALITIES

USE TO BE TAUGHT BASIC AND THEN ADVANCED, NOW IT IS REVERSED
LAWS OF PHYSICS NOT TAUGHT TILL PT 2 NEXT SEMESTER
REHAB MEANS TO MAKE THINGS NORMAL OR BETTER
REHAB IS JUST A PORTION OF WHAT WE NEED TO MAKE A PT BETTER, PART AND PARCEL OF WHAT WE DO

SIZE, WEIGHT, MANUFACTURER
MOST COMMON IS BY THERE PROPERTIES
PAGE 133 **THE ELECTROMAGNETIC SPECTRUM** TABLE 4-1
FREQ.: TIME PER SECOND REPEATED, HERTZ = HZ, CPS (C/S), BPS (B/S) UNITS OF MEASUREMENT,
(TEST PROPER NUMBERS BUT WRONG UNITS) EX: 27.12 MHZ, V, FREQ. 1000KM TO 1 X 10 IN
CHARTS

HIGH 9: 100,000Hz + = BE ABLE TO REPEAT BY 100,000 PER SECOND
CONVERSION "HEAT PROPAGATION"

DEEP HEAT

2" PENETRATION

ULTRASOUND DIATHERMY (USD)

SHORTWAVE DIATHERMY (SWD)

ALL SAME FAMILY, DEPENDING ON PT

MICROWAVE DIATHERMY (MWD)

MIDDLE 9: (SWD) NOT HEAT

1,000-100,000 Hz

CONDUCTION

DEEP MS/NERVE STIM.

1"

INTERFERENTIAL CURRENT (IC)

RUSSIAN STIM. CURRENT (RSC)

LOW 9:

1-1,000 Hz

CONDUCTION

SUPERFICIAL MS/NERVE STIM.

<1"

LOW VOLTAGE DIRECT CURRENT (LVDC)

HIGH VOLTAGE DIRECT CURRENT (HDVC)

FARADIC WAVE CURRENT (FWC)

SINE WAVE CURRENT (SWC)

SQUARE WAVE CURRENT (SQWC)

TRANSCUTANEOUS ELECTRICAL NERVE STIM. (TENS)

MICROCURRENT ELECTRICAL NERVE STIM. (MENS)

*******LOWS AND MIDDLES ARE NEXT SEMESTER*******

WAVELENGTH:

THERAPEUTIC APPLICATION:

TECHNICAL APPLICATION:

SCHOOL CLOSED LAST WEEK DUE TO FUNERAL FOR DR. MAPLES

MISSED LAB DUE TO REVIEW FOR BOARDS

9-19-00

SWD: ALL THINGS

LAB: ELECTROSTATIC DIATHERMY ELECTRODES: **AIR SPACED/CONDENSER
PADS/CUFFS/SINUS/INTERNAL**

ELECTROMAGNETIC SWD:

BEST FOR VASCULAR HEATING

NOT EFFECTED BY ADIPOSE TISSUE

A MAGNETIC FIELD

PATIENT NOT PART OF THE CIRCUIT

ELECTRODES: INDUCTION COIL/ PANCAKE COIL/DRUM (MONOPOLE OR DIPOLE)

Pg. 205 fig 5.23 PICTURE OF INDUCTION COIL (OUT OF THAT WILL FORM RADIATION)

Pg. 203 fig 5.21 COIL IMBEDDED TO A PIECE OF METAL AND COVER IT = MONOPOLE DRUM

MULTIPLE SURFACES = DIPOLE

AIRSPACED ELECTRODES CONDUCTION PLATES ↑

APPLICATIONS:

1 INCH OF TOWELING (PROTECTION) ALWAYS*

***EXCEPT FOR MONOPOLE DRUMS HAVE ALLOWED FOR AIR SPACE, SO USE ONE LAYER OF TOWELING, CLOTHING, ETC.**

***EXCEPT FOR THE AUTOTHERM MONOPOLE DRUM, USE 1 LAYER OF PROTECTION**

***EXCEPT FOR INTERNAL ELECTRODES**

1-2 INCH APART AVOIDS EDGE EFFECT (ANY TIME YOU HAVE TWO ELECTRODES TO CLOSE TOGETHER)

PULSED UNITS:

PENETRATION - WITHOUT - CONCENTRATION

EQUAL ON AND OFF TIME

“DON’T USE THE WRONG KIND OF HEAT”

USE ON ACUTE CASES, TRICKLE HEAT

INDICATIONS:

Pg. 193 AND 140

UPPER/LOWER RESPIRATORY CONDITIONS CAN BE TREATED (W/EITHER DIATHERMY)

ELECTROSTATIC BEST FOR CAVITY HEATING

SINUSITIS (ACCORDING TO CHARLES LAW OF GAS EXPANSION)

CONTRAINDICATIONS:

Pg. 193

4 FOOT RULE (JOHNSON'S)

KEEP MAGNETIC DEVICES FOUR FEET OR MORE AWAY

HEARING AIDS, PACE MAKERS, CELL PHONES, PAGERS, CREDIT CARDS, DIGITAL WATCHES, ETC.

IUD – NO TREATMENT

CONTACT LENS – REMOVED DUE TO DRY EYE EFFECT

Pg. 186,187,190, 195, 196, 197

200 fig 5-16, 5-17, 5-18 two = static , one = magnetic,

204 fig 5-22

LAB IN CLINIC ON THURSDAY

ULTRASOUND DIATHERMY: acute and chronic cases

USD

MECHANISM: 217,218,219 physics, 573 reverse piezoelectric effect correct

REVERSE PIEZOELECTRIC

EXPANSIONS AND CONTRACTIONS

SPECIFICATIONS:

f: 1.1 MHZ AND 3.3 MHZ

λ: 0.15 CM. Both

V: 100-2000 VOLTS speed or flow of electrons

PENETRATION: UP TO 2 INCHES

INTERFACES 212 FIG.5-31, 226 FIG. 5-44

Δ HEAT: **CONVERSION (FRICTION)**

POWER: W OR W/CM²

TIME: 5-MIN. ACUTE OR 15-MIN. CHRONIC (MAX)

EQUIPMENT:

PG. 223

TRANSDUCER HEAD:

PIEZOELECTRIC CRYSTALS

COUPLANT MEDIUM Pg. 220 FIG. 539

WATERPROOF HEAD Pg. 222

WEAR AND TEAR

CLEANING OF HEAD

PIEZOELECTRIC CRYSTALS:

BARIUM TITANATE - MOST COMMON 100 V GETS 3 WATTS

PZT – LEAD ZIRCONIUM TITANATE – SAME AS ABOVE

QUARTZ SULFATE - MOST STABLE

2000 V GETS 3 WATTS OF POWER

LITHIUM SULFATE – 500 V GETS 3 WATTS

PHYSIOLOGIC EFFECTS: 219, 220, 222, 223, 225

4 BASIC CATEGORIES:

CHEMICAL: Drive into tissue (PHONOPHORESIS)

MECHANICAL: GRADE 4 EFFECT, CAVITATION, RAREFACTION,

PHONOPHORESIS: PART OF CHEMICAL AND MECHANICAL

1-2 MM (EPIDERMIS, DERMIS, STRATUM CORNEUM)
NEURAL: SLOWS DOWN AXOPLASMIC FLOW, NERVE CONDUCTION VELOCITY
THERMAL:
 VOLUME HEATING – **3500 Meters/Seconds**
 STRUCTURAL HEATING – **1500 Meters/Seconds** KEEP SOUND HEAD MOVING EXCEPT (*****)
 1 INCH PER SECOND OF MOVEMENT

10-3-00

APPLICATIONS: 225

SHEARING EFFECT – BURNING OF SUBCUTANEOUS TISSUE
 (ACOUSTIC STREAMING = 3.3MHZ)

227,228, 229

DIASONIC USD (STATIC USD)*

RANGE OF INTENSITY = 0.05 – 0.3 W/CM² (THE EXCEPTION, DOES NOT NEED TO BE MOVED
 1 INCH PER/S)
 50 SQUARE CENTIMETERS ALL THAT CAN BE TREATED EVERY 15 MIN.

“READ PG. 229 = **COUPLANT CUSHION** TECHNIQUE FOR BONY PROMINENCE”

PG. 234 = TABLE 5.7

TYPE OF CASE	TYPE OF TISSUE	DOSAGE	UNDERWATER
ACUTE	THIN	0.5 – 1.0 W/CM ²	1.0 – 1.5 W/CM ²
ACUTE	THICK	1.0 – 1.5	1.5 – 2.0
CHRONIC	THIN	1.0 – 1.5	1.5 – 2.0
CHRONIC	THICK	1.5 – 2.0	2.0 – 2.5

THIN: ENTIRE HEAD AND NECK, UPPER EXTREMITIES, BELOW THE KNEE, SACRAL COCCYGEAL REGION AND SI JOINTS, *EVERYTHING ELSE IS THICK*
 MESOMORPHIC PATIENTS

DIRECT: INCREASE .5 W/CM²

SUBAQUEUS: .5 W/CM² COMPENSATES FOR ENERGY ABSORPTION BETWEEN APPLICATOR AND SKIN SURFACE BEING TREATED.

READ: 235, 236, 240, 293, DON'T INCLUDE COUPLED MODALITIES (MS STIM + USD)

1.0 MHZ (CONTINUOUS) = SUBACUTE, DEEP, CHRONIC JOINT, MS. DISORDERS

3.3 MHZ (PULSED) = ACUTE SURFACE, WATERBATH

ULTRASOUND:

WATTS = QUANTITY, MODALITY OUTPUT

W/SQ. CM = QUALITY, THERAPEUTIC OUTPUT

10 watts

1.5 – ACUTE THICK, CHRONIC THIN

1.0 – ACUTE THIN,

$$\frac{W}{CM^2} = 10$$

CM² = 10 = 1.0 W/SQ.CM

1.0 w/cm²

READ BOTTOM LINE TO SET MODALITY

CALIBRATED FOR SIZE OF TRANSDUCER HEAD = W/SQ.CM LINE (BOTTOM)

IF NOT CALIBRATED FOR DIFFERENT SOUND HEAD -DO THE MATH = TOP LINE FOR WATTS (20/20=1)

MAX TIME 2.5 WATTS/ FOR TEST HE WILL CHANGE NUMBERS

MICROWAVE DIATHERMY Pg209

DEFINITIONS:

**SUPERFICIAL LOCALIZED HEAT (FAT MS LAYER)
MAGNETIC FIELD
MORE CONCENTRATED THAN SWD
LESS PENETRATION THAN SWD
1/3 AS EFFECTIVE OVERALL OF SWD**

SPECIFICATIONS:

**9: 915 MHz (CONTACT) & 2456 MHz (NON-CONTACT)
λ: 12.2 cm
2 IN. (FAT/MS)
CONVERSION
TEMPERATURE: 106⁰ F
POWER: TO 100 W (%OF POWER ON METER) MAX
TREATMENT TIME: 10-20 MINUTES**

MAGNETRON
DIRECTOR- ANTENNA = EMISSION
- REFLECTOR
COAXIAL CABLE, SPACER

Parts of MWD unit
ROTATING ANTENNA TO PREVENT ETCHING OR WEAR AND TEAR

ORGAN TISSUE AND CARDIO TISSUE ON #209

INFRARED RADIATION Pg. 147

MECHANISMS:

**HELIO THERAPY (SUN THERAPY)
(60%UV, 40% IR)
HEATING ELEMENTS (Pg.151)
(TRANSFERRED BY PHOTONS)
PHOTOTHERMAL EFFECT (LIGHT—HEAT—CONVERSION)**

**SPECIFICATIONS: (0 FREQ.) (Pg. 133)
LONG WAVE VS. SHORT WAVE**

<u>LONG WAVE IR</u>	<u>SHORT WAVE IR</u>
FAR WAVE IR	NEAR WAVE IR
15,000-120,000A	7500-14,000A
0.1 – 3.0 mm	5 – 10 mm
113.9F	110.8F
107 F (subsurface)	117.8 F (subsurface)
NON-LUMINOUS	LUMINOUS
	CANDESCENT
	INCANDESCENT

APPLICATIONS: Pg. 147, 148, 149, 150, 153, 154

DIRECT OR TOWELING

(ONE LAYER OF TOWELING TO PROTECT PT.)

2 FEET OF DISTANCE FROM PT

TOWELING – WET OR DRY

(MOISTURE RECOMMENDED)

PROTECT THE EYES (CLOSE EYES)

COSINE (LAMBERT'S COSINE) LAW

INVERSE SQUARE LAW

Pg. 155 Fig. 4-13 (90° angle is 100% radiation effect, less with less angle)

COSINE = MORE TOWELING OR MORE ANGULATION OF LAMP FOR LESS INTENSITY TO PATIENT

INVERSE SQUARE LAW = TREATMENT DISTANCE: 18-24 IN. (18-36 OK)

PT-----IR 1200W-2IN.

-----2FT-----IR 1200W-2IN.

4800 W

PT-----4FT-----IR 300 W-2IN.

TREATMENT TIME: 20-30 MIN.

REST PERIOD: 10-15 MIN. (SUPERFICIALLY COOLING TIME OF PT) PRIOR TO MANIPULATION BY DC ("10 MIN." BEST)

OTHER CONJUNCTIVE TREATMENTS

INDICATIONS: Pg. 193

CONTRAINDICATIONS: Pg. 140

END OF MATERIAL FOR MIDTERM

Start of Material from 10-24-00

ULTRAVIOLET RADIATION:

HELIO THERAPY – 40% UV (SUN)

ACTINIC = PHOTOCHEMICAL EFFECTS (BY RAYS OF LIGHT)

ARGON/NEON O₂/UV-→O₃=OZONE (0 OZONE 0 UV)

100% QUARTS GLASS

CURRENT TO CREATE A CIRCUIT

MERCURY VAPOR ARC

(OLD)

LONG WAVE UV (NEAR UV):

WAVELENGTH: 2000-4000 A (NEARER TO VISUAL SPECTRUM)

PENETRATION: 0.3-0.5 mm

SHORT WAVE UV (FAR UV):

WAVELENGTH: 1800-2000A (FARTHER FROM VISUAL SPECTRUM)

PENETRATION: 0.1-0.3 mm

(NEW)

UV-A:

NEAR BAND RANGE 3400-3600A

PHOTOSENSITIVE AGENTS

TANNING PARLORS, DERMATOLOGISTS TX

UV-B:

NEAR BAND 2900-3100A

HOT QUARTS RADIATORS

HIGH VAPOR PRESSURE

HIGH HEAT (8000C/14,432F)

HIGH AMPERAGE (5-20A) LIKE ELECTRIC CHAIR

MERCURY & ARGON

30 INCH RULE

“BACTERIAL EFFECTS”

UV-C:

FAR BAND 2000-2900A

2537 A-90% BACTERICIDAL, VIRAL, FUNGAL, PARASITES

COLD QUARTZ RADIATOR

LOW VAPOR PRESSURE

LOW HEAT (60C/140F)

LOW AMPERAGE (2 AMPS)

STEP-UP TRANSFORMER (2500V)

MERCURY & NEON (WEAK, ↓ENERGY)

1 INCH AWAY

BACTERICIDAL EFFECT

Pg. 156-157

$$W = A \times V$$

POWER QUANTITY OF ELECTRONS QUALITY (HOW FAST) V (KVP) EMF