CONTENTS

Preface vi User's Guide viii Reviewers xii Forward xiii

PART I: IN PERSPECTIVE

1 THERAPEUTIC MODALITIES: WHAT THEY ARE AND WHY THEY ARE USED 2

Defining and Classifying Therapeutic Modalities 3
Maximizing the Effectiveness of Therapeutic
Modalities 4
Selecting a Therapeutic Modality 5
Rehabilitation and Therapeutic Modalities 5
A Systems Approach to Rehabilitation 7
The Psychology of Rehabilitation 16
Preparation for Using Therapeutic Modalities 16

2 EVIDENCE-BASED PRACTICE 20

Evidence-Based Medicine 21 Patient-Centered Care 36 Clinical Decision Making 36

3 GENERAL APPLICATION PROCEDURES 44

Application Approaches 45
The Five-Step Application Procedure 46

4 INJURY RECORD KEEPING 50

Record Keeping 51
The Purpose of Keeping Records 51
Using Records and Forms 52
Record Use and Abuse 56
Review Questions 58

PART II: ORTHOPEDIC INJURY, IMMEDIATE CARE, AND HEALING

5 TISSUE RESPONSE TO INJURY: INFLAMMATION, SWELLING, AND EDEMA 62

The Inflammatory Response 63

An Acute Orthopedic Injury Model 69 Secondary Injury 71 Swelling: Hemorrhaging and Edema 72

6 IMMEDIATE CARE OF ACUTE ORTHOPEDIC INJURIES 78°

RICES: The Prescription for Immediate Care 79
The Theoretical Basis for RICES 81
The Physics and Physiology of Cryotherapy 86
Cryotherapy Application Principles 91
Compression Application Principles 99
Contraindications and Precautions to RICES 100
Electrical Stimulation During Immediate Care 101
Application of RICES 102
The Use of Crutches 104
Medicated Ice for Abrasions 106

7. THE HEALING PROCESS 112

The Repair of Injured Tissue 113
The Phases of Repair 113
Healing Modifiers 117
Review Questions 121

PART III: PAIN AND ORTHOPEDIC INJURIES

8 UNDERSTANDING PAIN AND ITS RELATIONSHIP TO INJURY 124

What Is Pain? 125
Pain Basics: The Language of Pain 126
Theories About Pain 134
Drugs, Endogenous Chemicals, and Pain
Relief 137
Pain Perception 138
Postgate Pain Theories 140
More Language of Pain: Types/Classification 142
Pain Management 144

9 RELIEVING ORTHOPEDIC INJURY PAIN 150

The Philosophy and Principles of Pain Relief 151 Sources of Orthopedic Injury Pain 153 The Placebo Effect and Pain Relief 154
Use a Variety of Techniques 155
Tools for Relieving Pain 155
Monitoring and Assessing Pain Relief During
Rehabilitation 159
Review Questions 165

PART IV: THERAPEUTIC HEAT AND COLD

10 PRINCIPLES OF HEAT FOR THERMOTHERAPY 168

Defining Thermotherapy 169
Transferring Heat to and From the Body 169
The Therapeutic Use of Heat 172
Radiation and Electromagnetic Waves 173
Thermal Effects of Electromagnetic Waves 176
Applying Radiation 176
Acoustic Waves 178

11 SUPERFICIAL THERMOTHERAPY APPLICATION 180

Superficial Thermotherapy 181
Whirlpool Application 182
Hot Pack Application 185
Paraffin Bath Application 189
Do Not Apply Infrared Lamps 191
Other Superficial Heating Devices 191

12 CRYOTHERAPY BEYOND IMMEDIATE CARE 196

Cryotherapy: Not Just Immediate Care 197
The Physiological Effects of Cold Application 199
Cold-Induced Vasodilation: Facts and Fallacies 201
Heat vs Cold: When and Why 210
Cryotherapeutic Techniques for Transition and Subacute Care 211
Recovery Cryotherapy 213
Comparing Heat and Cold for Rehabilitation 214

13 CRYOTHERAPY APPLICATION FOR POSTIMMEDIATE CARE 220

Transition and Subacute Care Cryotherapy
Techniques 221
Application of Cryokinetics for Joint Sprains 223
Application of Cryostretch for Muscle Injuries 229
Application of Combined Cryostretch and
Cryokinetics 231

Application of Connective Tissue Stretch 231 Application of Lymphedema Pumps 233

14 THERAPEUTIC ULTRASOUND 236

Introducing Therapeutic Ultrasound 237 Clinical Therapeutic Ultrasound 238 Components of an Ultrasound Device 238 The Physics of Ultrasound 239 Treatment Parameters 245 Application Techniques 249 Recording Treatment Dosages Thermal Effects 253 Nonthermal Effects 253 Evidence for Therapeutic Ultrasound 254 Cases Where Ultrasound and Joint Mobilizations Were Used to Restore Full ROM in Severe Injuries 258 Phonophoresis 261 Using Ultrasound and Other Modalities Collectively 262 Treatment Precautions and Concerns 263 Long Duration Ultrasound 264 The Future of Ultrasound Therapy 266 Challenges to the Efficacy of Therapeutic Ultrasound 267 Application of Therapeutic Ultrasound 268

15 DIATHERMY 275

Introducing Diathermy 276
Types of Diathermy 276
Continuous and Pulsed Shortwave Diathermy 279
Physiological Effects of Diathermy 281
Optimal Tissue Temperatures 282
Treatment Time 282
Clinical Applications of Shortwave Diathermy 283
Diathermy Treatment Contraindications and
Precautions 287
Evidence for Diathermy 288
Advantages of PSWD Over Ultrasound 289
Application of Diathermy 290
Review Questions 294

PART V: ELECTROTHERAPY

16 PRINCIPLES OF ELECTRICITY FOR ELECTROTHERAPY 300

A Common Language 301
The Basics of Electricity 301
Electrical Equipment 304
The Generation of Electricity 304

17	APPLICATION PROCEDURES: ELECTROTHERAPY 322
	Electrotherapy Applications: An Overview 323
	Transcutaneous Electrical Nerve Stimulation for Pain Relief 325
	Application of Transcutaneous Electrical Nerve Stimulation 326
	Interferential Current Therapy for Pain Relief 329
	Application of Interferential Current Therapy 332
	Neuromuscular Electrical Stimulation 335
	Application of Neuromuscular Electrical
	Stimulation 337
	Patterned Electrical Nerve Stimulation 340
	Application of Patterned Electrical Nerve
	Stimulation 342
	Iontophoresis for Transdermal Drug Delivery 344
	Benefits of Iontophoresis 344
	Application of Iontophoresis for Transcutaneous Drug
	Delivery 348
	High-Volt Pulsed Current Stimulation for Wound
	Healing 350
	Application of High-Volt Pulsed Current
	Stimulation 353

Output Current Characteristics 308

Tissue Responses to Electrical Stimulation 312

Therapeutic Uses of Electrical Stimulation

PART VI: MANUAL MODALITIES

Review Questions 361

18 THERAPEUTIC MASSAGE 364

Massage as a Therapeutic Modality 365
Massage Therapy: What Is It? 365
Facts and Misconceptions About Massage 366
Indications and Contraindications 367
Therapeutic Massage vs a Rubdown 368
Common Massage Strokes Used in Basic (Swedish)
Massage 368
Myofascial Release 371
Sports Massage 374
Massage Lubricants 374
Application of Therapeutic Massage 375

Microcurrent Electrical Nerve Stimulation 355

19 SPINAL TRACTION 380

Cervical Pain and Lumbar Pain 381
The Intervertebral Disk 381
Traction as a Therapeutic Modality 382
The Physiological Effects of Traction 382

Guidelines Prior to Applying Traction 383
Indications for Traction 383
Contraindications for Traction 383
Commonly Used Traction Devices 384
Cervical Traction 384
Lumbar Traction 385
Treatment Parameters 389
Application of Spinal Traction 391

20 POSITIONAL RELEASE THERAPY 396

Introducing Positional Release Therapy 397
Defining Tender Points and Trigger Points 398
Tissue Assessment and Documentation 399
Strain Counterstrain vs Positional Release Therapy 400
Speicher and Draper's Top 10 Positional Release
Therapy Techniques 404
Application of Positional Release Therapy 410
Review Questions 414

PART VIIDOTHER MODALITIES

21 PHOTOBIOMODULATION (LIGHT AND LASER) THERAPY 418

Photobiomodulation 419
The Nature of Light 419
Photobiomodulation Treatment Parameters 421
Photobiomodulation Therapy 423
Effects of Photobiomodulation 426
Application of Photobiomodulation 429

22 NITROGEN VAPOR CRYOTHERAPY 433

Review of Cryotherapy's Physiological Effects 434
What Is Nitrogen Vapor Cryotherapy? 434
Introduction to Whole- and Partial-Body
Cryotherapy 434
Local Liquid Nitrogen Vapor Cryotherapy 437
Evidence for Whole-Body, Partial-Body, and Local
Cryotherapy 440
Three Cases Where the Partial-Body Cryotherapy Has
Been Beneficial 440
Application of Whole- and Partial-Body
Cryotherapy 441
Application of Local Nitrogen Vapor
Cryotherapy 442

23 PULSED ELECTROMAGNETIC FIELD THERAPY 445

Introduction to Pulse Electromagnetic Field Therapy 446

Physiological Effects of PEMF 446 Evidence for PEMF Therapy 447 Indications for PEMF 448 estions 478. And who the set Munier, Inc. Has who itself the production of the contract of the Contraindications 448 Precautions 448

CASE STUDIES USING THERAPEUTIC MODALITIES 471

Clinical Case Studies 472 Possible Treatment Regimens 474 Review Questions 478